

Amendments to the CLAIMS

1. (Original) Organic semiconductors comprising

(A) at least one polymer,

(B) at least one structural unit $L=X$, where the following applies to the symbols used:

L is on each occurrence, identically or differently, $(R^1)(R^2)C$, $(R^1)P$, $(R^1)As$, $(R^1)Sb$, $(R^1)Bi$, $(R^1)(R^2)(R^3)P$, $(R^1)(R^2)(R^3)As$, $(R^1)(R^2)(R^3)Sb$, $(R^1)(R^2)(R^3)Bi$, $(R^1)(R^2)S$, $(R^1)(R^2)Se$, $(R^1)(R^2)Te$, $(R^1)(R^2)S(=O)$, $(R^1)(R^2)Se(=O)$ or $(R^1)(R^2)Te(=O)$;

X is on each occurrence, identically or differently, O , S , Se or $N-R^4$, with the proviso that X is not S or Se if L stands for S , Se or Te ;

R^1 , R^2 , R^3 is on each occurrence, identically or differently, H , F , CN , $N(R^4)_2$, a straight-chain, branched or cyclic alkyl, alkoxy or thioalkoxy group having 1 to 40 C atoms, which may be substituted by R^5 or may also be unsubstituted, where one or more non-adjacent CH_2 groups may be replaced by $-R^6C=CR^6-$, $-C\equiv C-$, $Si(R^6)_2$, $Ge(R^6)_2$, $Sn(R^6)_2$, $C=O$, $C=S$, $C=Se$, $C=NR^6$, $-O-$, $-S-$, $-NR^6-$ or $-CONR^6-$ and where one or more H atoms may be replaced by F , Cl , Br , I , CN or NO_2 , or an aromatic or heteroaromatic ring system having 1 to 40 C atoms, which may be substituted by one or more radicals R^5 , where two or more substituents R^1 , R^2 and/or R^3 may also with one another form a mono- or polycyclic, aliphatic or aromatic ring system; all substituents R^1 to R^3 on one structural unit here must not be H or F ; the groups R^1 to R^3 may furthermore optionally have bonds to the polymer;

R^4 is on each occurrence, identically or differently, a straight-chain, branched or cyclic alkyl or alkoxy chain having 1 to 22 C atoms, in which, in addition, one or more non-adjacent C atoms may be replaced by $-R^6C=CR^6-$, $-C\equiv C-$, $Si(R^6)_2$, $Ge(R^6)_2$, $Sn(R^6)_2$, $-NR^6-$, $-O-$, $-S-$, $-CO-O-$, $-O-CO-O-$, where, in addition, one or more H atoms may be replaced by fluorine, an aryl, heteroaryl or aryloxy group having 1 to 40 C atoms, which may also be substituted by one or more radicals R^6 , or OH or $N(R^5)_2$;

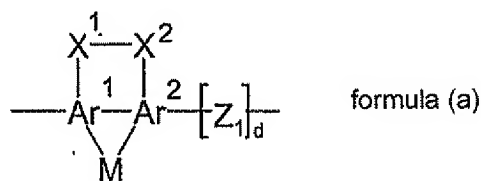
R^5 is on each occurrence, identically or differently, R^4 or CN , $B(R^6)_2$ or $Si(R^6)_3$,

R^6 is on each occurrence, identically or differently, H or an aliphatic or aromatic hydrocarbon radical having 1 to 20 C atoms;

and

(C) at least one triplet emitter;

with the proviso that mixtures of two polymers in which the first polymer contains covalently bonded triplet emitters and the other is a copolymer comprising TPD units and diphenyl sulfone ether or diphenyl ketone ether units are excluded; and furthermore with the proviso that polymers containing on the one hand covalently bonded triplet emitters and on the other hand units of the formula (a) are excluded from the invention:



in which Ar^1 and Ar^2 each independently denote a tetravalent aromatic hydrocarbon group or a tetravalent heterocyclic group;

one of the units X^1 and X^2 denotes $\text{C}(=\text{O})$ or $\text{C}(\text{R}^1)(\text{R}^2)$ and the other denotes O, S, $\text{C}(=\text{O})$, $\text{S}(=\text{O})$, SO_2 , $\text{Si}(\text{R}^3)(\text{R}^4)$, $\text{N}(\text{R}^5)$, $\text{B}(\text{R}^6)$, $\text{P}(\text{R}^7)$ or $\text{P}(=\text{O})(\text{R}^8)$; where the radicals R^1 , R^2 , R^3 , R^4 , R^5 , R^6 , R^7 and R^8 in the formula (a) each independently denote a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkylthio group, an alkylamino group, an aryl group, an aryloxy group, an arylthio group, an arylamino group, an arylalkyl group, an arylalkoxy group, an arylalkylthio group, an arylalkylamino group, an acyl group, an acyloxy group, an amide group, an imine group, a substituted silyl group, a substituted silyloxy group, a substituted silylthio group, a substituted silylamino group, a monovalent heterocyclic group, an arylalkenyl group, an arylolefinyl group or a cyano group,

M denotes a group which is represented by formula (b), formula (c) or formula (d)

$-\text{Y}^1-\text{Y}^2-$ formula (b)

in which Y^1 and Y^2 each independently denote O, S, C(=O), S(=O), SO₂, C(R⁹)(R¹⁰), Si(R¹¹)(R¹²), N(R¹³), B(R¹⁴), P(R¹⁵) or P(=O)(R¹⁶),

where the radicals R⁹, R¹⁰, R¹¹, R¹², R¹³, R¹⁴, R¹⁵ and R¹⁶ in the formula (b) each independently denote a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkylthio group, an alkylamino group, an aryl group, an aryloxy group, an arylthio group, an arylamino group, an arylalkyl group, an arylalkoxy group, an arylalkylthio group, an arylalkylamino group, an acyl group, an acyloxy group, an amide group, an imine group, a substituted silyl group, a substituted silyloxy group, a substituted silylthio group, a substituted silylamino group, a monovalent heterocyclic group, an arylalkenyl group, an arylethynyl group or a cyano group,

where Y^1 and Y^2 are not identical if Y^1 is not C(R⁹)(R¹⁰) or Si(R¹¹)(R¹²).]

-Y³=Y⁴- formula (c)

in which Y^3 and Y^4 each independently denote N, B, P, C(R¹⁷) or Si(R¹⁸);

the radicals R¹⁷ and R¹⁸ in the formula (c) each independently denote a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkylthio group, an alkylamino group, an aryl group, an aryloxy group, an arylthio group, an arylamino group, an arylalkyl group, an arylalkoxy group, an arylalkylthio group, an arylalkylamino group, an acyl group, an acyloxy group, an amide group, an imine group, a substituted silyl group, a substituted silyloxy group, a substituted silylthio group, a substituted silylamino group, a monovalent heterocyclic group, an arylalkenyl group, an arylethynyl group or a cyano group;

-Y⁵- formula (d)

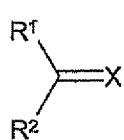
in which Y^5 denotes O, S, C(=O), S(=O), SO₂, C(R¹⁹)(R²⁰), Si(R²¹)(R²²), N(R²³), B(R²⁴), P(R²⁵) or P(=O)(R);

where the radicals R¹⁹, R²⁰, R²¹, R²², R²³, R²⁴, R²⁵ and R²⁶ in the formula (d) each independently denote a hydrogen atom, a halogen atom, an alkyl group, an alkoxy group, an alkylthio group, an alkylamino group, an aryl group, an aryloxy group, an arylthio group, an arylamino group, an arylalkyl group, an arylalkoxy group, an arylalkylthio group, an arylalkylamino group, an acyl group, an acyloxy group, an amide group, an imine group, a substituted silyl group, a substituted

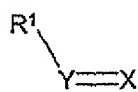
silyloxy group, a substituted silylthio group, a substituted silylamino group, a monovalent heterocyclic group, an arylalkenyl group, an arylethynyl group or a cyano group;

Z_1 denotes $-CR^{36}=CR^{37}-$ or $-C\equiv C-$; R^{36} and R^{37} each independently denote a hydrogen atom, an alkyl group, an aryl group, a monovalent heterocyclic group or a cyano group; d denotes 0 or 1.

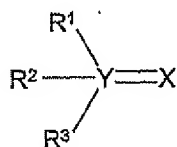
2. (Original) Organic semiconductors according to Claim 1, characterised in that the structural units $L=X$ are selected from the formulae (1) to (5)



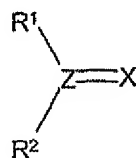
formula (1)



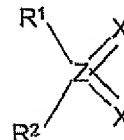
formula (2)



formula (3)



formula (4)



formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or $N-R^4$, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

R^1 to R^6 have the same meaning as described under Claim 1.

3. (Previously Presented) Organic semiconductors according to Claim 2, characterised in that they comprise at least 0.5% by weight of at least one polymer, at least 1% by weight of at least one structural unit $L=X$ or a structural unit of the formulae (1) to (5) and at least 0.1% by weight of at least one triplet emitter.

4. (Currently Amended) Mixtures (~~BLEND1~~), (BLEND2) comprising

(A) 5 – 99.9% by weight of at least one polymer (POLY1) which comprises 1 – 100 mol% of one or more recurring units (MONO1) containing at least one structural unit $L=X$ or at least one structural unit of the formula (1) to (5),

wherein

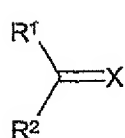
L is on each occurrence, identically or differently, $(R^1)(R^2)C$, $(R^1)P$, $(R^1)As$, $(R^1)Sb$, $(R^1)Bi$, $(R^1)(R^2)(R^3)P$, $(R^1)(R^2)(R^3)As$, $(R^1)(R^2)(R^3)Sb$, $(R^1)(R^2)(R^3)Bi$, $(R^1)(R^2)S$, $(R^1)(R^2)Se$, $(R^1)(R^2)Te$, $(R^1)(R^2)S(=O)$, $(R^1)(R^2)Se(=O)$ or $(R^1)(R^2)Te(=O)$;

X is on each occurrence, identically or differently, O , S , Se or $N-R^4$, with the proviso that X is not S or Se if L stands for S , Se or Te ;

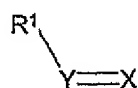
R^1 to R^6 are defined in Claim 1,

and

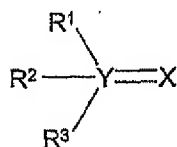
wherein the formulae (1) to (5) are as follows:



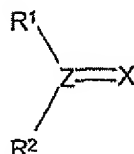
formula (1)



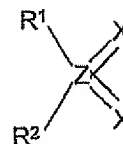
formula (2)



formula (3)



formula (4)



formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O , S , Se or $N-R^4$, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P , As , Sb or Bi ;

Z is on each occurrence, identically or differently, S , Se or Te ;

R^1 to R^6 have the same meaning as described above,

and

(B) 0.1 – 95% by weight of one or more triplet emitters (TRIP1).

5. (Currently Amended) Mixtures (~~BLEND2~~), (BLEND2) comprising

(A) 0.5 – 99% by weight of at least one polymer (POLY2) which comprises 0.5 – 99.5 mol% of one or more triplet emitters (TRIP2) covalently bonded,

and

(B) 1 – 99.5% by weight of at least one compound (COMP1) which contains at least one structural unit $L=X$ or at least one structural unit of the formula (1) to (5)

wherein

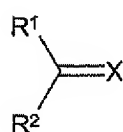
L is on each occurrence, identically or differently, $(R^1)(R^2)C$, $(R^1)P$, $(R^1)As$, $(R^1)Sb$, $(R^1)Bi$, $(R^1)(R^2)(R^3)P$, $(R^1)(R^2)(R^3)As$, $(R^1)(R^2)(R^3)Sb$, $(R^1)(R^2)(R^3)Bi$, $(R^1)(R^2)S$, $(R^1)(R^2)Se$, $(R^1)(R^2)Te$, $(R^1)(R^2)S(=O)$, $(R^1)(R^2)Se(=O)$ or $(R^1)(R^2)Te(=O)$;

X is on each occurrence, identically or differently, O, S, Se or $N-R^4$, with the proviso that X is not S or Se if L stands for S, Se or Te;

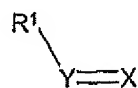
R^1 to R^6 are defined in Claim 1,

and

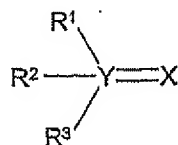
wherein the formulae (1) to (5) are as follows:



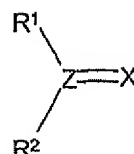
formula (1)



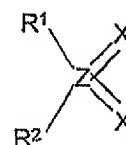
formula (2)



formula (3)



formula (4)



formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or N-R⁴, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

R¹ to R⁶ are defined above,

and is capable of forming glass-like layers at room temperature.

6. (Currently amended) Mixtures (~~BLEND3~~), (BLEND3) comprising

(A) 0.5 – 98.9% by weight of any desired polymer (POLY3),

and

(B) 1 – 99% by weight of at least one compound (COMP1) which contains at least one structural unit L=X or at least one structural unit of the formula (1) to (5) and is capable of forming glass-like layers at room temperature,

wherein

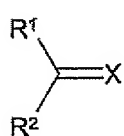
L is on each occurrence, identically or differently, (R¹)(R²)C, (R¹)P, (R¹)As, (R¹)Sb, (R¹)Bi, (R¹)(R²)(R³)P, (R¹)(R²)(R³)As, (R¹)(R²)(R³)Sb, (R¹)(R²)(R³)Bi, (R¹)(R²)S, (R¹)(R²)Se, (R¹)(R²)Te, (R¹)(R²)S(=O), (R¹)(R²)Se(=O) or (R¹)(R²)Te(=O);

X is on each occurrence, identically or differently, O, S, Se or N-R⁴, with the proviso that X is not S or Se if L stands for S, Se or Te;

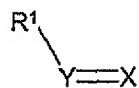
R¹ to R⁶ are defined in Claim 1,

and

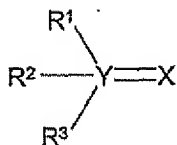
wherein the formulae (1) to (5) are as follows:



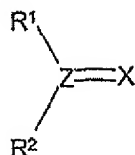
formula (1)



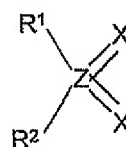
formula (2)



formula (3)



formula (4)



formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or N-R⁴, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

R¹ to R⁶ are defined above,

and

(C) 0.1 – 95% by weight of one or more triplet emitters (TRIP1).

7. (Currently amended) Mixtures (~~BLEND4~~), (BLEND 4) comprising

(A) 0.5 – 99% by weight of at least one polymer (POLY3);

and

(B) 1 – 99.5% by weight of a compound (TRIP3) which contains at least one structural unit L=X or at least one structural unit of the formula (1) to (5) covalently bonded to one or more triplet emitters,

wherein

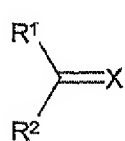
L is on each occurrence, identically or differently, $(R^1)(R^2)C$, $(R^1)P$, $(R^1)As$, $(R^1)Sb$, $(R^1)Bi$, $(R^1)(R^2)(R^3)P$, $(R^1)(R^2)(R^3)As$, $(R^1)(R^2)(R^3)Sb$, $(R^1)(R^2)(R^3)Bi$, $(R^1)(R^2)S$, $(R^1)(R^2)Se$, $(R^1)(R^2)Te$, $(R^1)(R^2)S(=O)$, $(R^1)(R^2)Se(=O)$ or $(R^1)(R^2)Te(=O)$;

X is on each occurrence, identically or differently, O, S, Se or $N-R^4$, with the proviso that X is not S or Se if L stands for S, Se or Te;

R^1 to R^6 are defined in Claim 1,

and

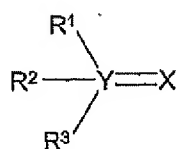
wherein the formulae (1) to (5) are as follows:



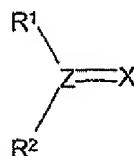
formula (1)



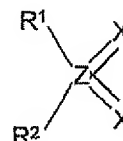
formula (2)



formula (3)



formula (4)



formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or $N-R^4$, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

R^1 to R^6 are defined above,

where the bonding between the triplet emitter and the structural unit $L=X$ can take place in any desired positions of the two units, with the restriction that at least one group X in (TRIP3) must be in free form and not coordinated to a metal atom.

8. (Original) Polymers POLY4 comprising

(A) 1 – 99.9 mol% of one or more recurring units MONO1 containing at least one structural unit $L=X$, where symbols L , X , R^1 , R^2 , R^3 , R^4 , R^5 and R^6 have the same meaning as described under Claim 1;

(B) 0.1 – 95 mol% of one or more triplet emitters TRIP2.

9. (Previously Submitted) Organic semiconductors according to claim 2, characterised in that the at least one polymer is a polymer (POLY1 to POLY4)

wherein

(POLY1) comprises 1 – 100 mol% of one or more recurring units (MONO1) containing at least one structural unit $L=X$ or at least one structural unit of the formula (1) to (5);

(POLY2) comprises 0.5 – 99.5 mol% of one or more triplet emitters (TRIP2) covalently bonded;

(POLY3) is at least one polymer;

(POLY4) comprising

(A) 1 – 99.9 mol% of one or more recurring units MONO1 containing at least one structural unit $L=X$, where symbols L , X , R^1 , R^2 , R^3 , R^4 , R^5 and R^6 have the same meaning as described under Claim 1;

(B) 0.1 – 95 mol% of one or more triplet emitters TRIP2;

are conjugated, partially conjugated, cross-conjugated or non-conjugated.

10. (Previously Presented) Organic semiconductors according to claim 9, characterised in that the polymers POLY1 to POLY4 contain further structural elements.

11. (Previously Presented) Organic semiconductors according to claim 2, characterised in that the following applies to the symbols of the formulae (1) to (5):

X stands for O, S or N-R⁴;

Y stands for P or As;

Z stands for S or Se;

where at least one of the substituents R¹ to R³ on each structural unit of the formula (1) to (5) represents an aromatic or heteroaromatic ring system having 1 to 40 C atoms, which may be substituted by one or more substituents R⁴ or unsubstituted.

12. (Previously Presented) Organic semiconductors according to Claim 11, characterised in that the following applies to the symbols of the formulae (1) to (5):

X stands for O or N-R⁴;

Y stands for P;

Z stands for S;

where all substituents R¹ to R³ on each structural unit of the formula (1) to (5) represent an aromatic or heteroaromatic ring system having 1 to 40 C atoms, which may be substituted by one or more substituents R⁴ or unsubstituted.

13. (Previously Presented) Organic semiconductors according to claim 1, characterised in that at least one of the radicals R¹ to R³ contains a 9,9'-spirobifluorene.

14. (Cancelled).

15. (Previously Presented) Organic semiconductors according to claim 1, characterised in that the polymers are selected from the classes of the aromatic polyketones, aromatic polyphosphine oxides or aromatic polysulfones, each of which may also be substituted for better solubility, the polycarboxylic acid derivatives, main-chain polyesters, side-chain polyesters, poly(glycolic acids), poly(lactic acids), poly(ϵ -caprolactones), polyacrylates,

poly(hydroxybenzoic acids), poly(alkylene terephthalates), polycarboxylic anhydrides, polyamides, poly(ϵ -caprolactams), polypeptides, polyaramids, polybenzamides, polyimides, poly(amide-imides), poly(ester-imides), poly(ether-imides), polycarbonates, poly(ester-co-carbonates), poly(isocyanurates), polyurethanes, polyester-polyurethanes, poly(terephthalates), poly(acrylates), poly(phenyl acrylates), poly(cyanoacrylates), poly(vinyl esters), poly(vinyl acetates), side-chain polyphosphine oxides, polyether ketones (PEK), polyether sulfones, polysulfonamides, polysulfonimides, poly(vinyl ketones), aromatic polyvinyl ketones, substituted or unsubstituted poly(vinylbenzophenones), polystyrene-analogous ketones, polycarbazenes, polynitriles, polyisonitriles, polystyrene, PVK (polyvinylcarbazole) or derivatives thereof.

16. Cancelled

17. Cancelled

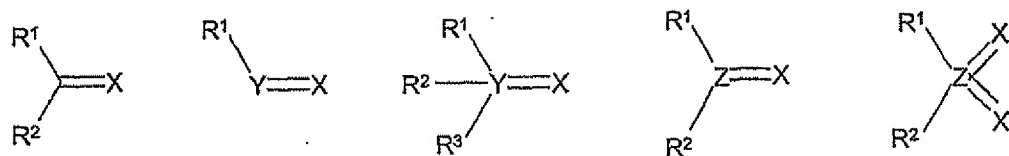
18. (Previously Presented) Organic semiconductors according to claim 1, characterised in that the triplet emitters contain atoms from the Periodic Table of the Elements having an atomic number of greater than 36.

19. (Original) Organic semiconductors according to Claim 18, characterised in that the triplet emitters contain d or f transition metals.

20. (Original) Organic semiconductors according to Claim 19, characterised in that the triplet emitters contain metals from group 8 to 10.

21. (Previously Presented) Organic semiconductors according to claim 1, characterised in that further molecules, which may be of low molecular weight, oligomeric, dendritic or polymeric, are admixed with the organic semiconductors.

22. (Previously Presented) Organic semiconductors according to Claim 21, characterised in that compounds containing structural units $L=X$ or structural units of the formula (1) to (5) may additionally be admixed with the mixture



formula (1)

formula (2)

formula (3)

formula (4)

formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or N-R⁴, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

R¹, R², R³ is on each occurrence, identically or differently, H, F, CN, N(R⁴)₂, a straight-chain, branched or cyclic alkyl, alkoxy or thioalkoxy group having 1 to 40 C atoms, which may be substituted by R⁵ or may also be unsubstituted, where one or more non-adjacent CH₂ groups may be replaced by -R⁶C=CR⁶-, -C≡C-, Si(R⁶)₂, Ge(R⁶)₂, Sn(R⁶)₂, C=O, C=S, C=Se, C=NR⁶, -O-, -S-, -NR⁶- or -CONR⁶- and where one or more H atoms may be replaced by F, Cl, Br, I, CN or NO₂, or an aromatic or heteroaromatic ring system having 1 to 40 C atoms, which may be substituted by one or more radicals R⁵, where two or more substituents R¹, R² and/or R³ may also with one another form a mono- or polycyclic, aliphatic or aromatic ring system; all substituents R¹ to R³ on one structural unit here must not be H or F; the groups R¹ to R³ may furthermore optionally have bonds to the polymer;

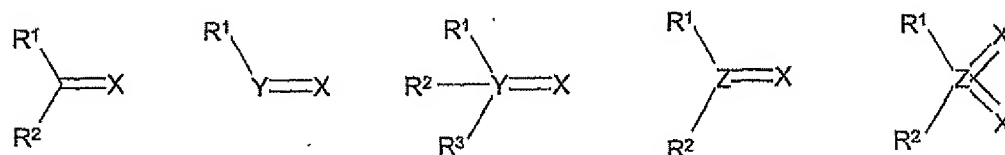
R⁴ is on each occurrence, identically or differently, a straight-chain, branched or cyclic alkyl or alkoxy chain having 1 to 22 C atoms, in which, in addition, one or more non-adjacent C atoms may be replaced by -R⁶C=CR⁶-, -C≡C-, Si(R⁶)₂, Ge(R⁶)₂, Sn(R⁶)₂, -NR⁶-, -O-, -S-, -CO-O-, -O-CO-O-, where, in addition, one or more H atoms may be replaced by fluorine, an aryl, heteroaryl or aryloxy group having 1 to 40 C atoms, which may also be substituted by one or more radicals R⁶, or OH or N(R⁵)₂;

R^5 is on each occurrence, identically or differently, R^4 or CN, $B(R^6)_2$ or $Si(R^6)_3$,

R^6 is on each occurrence, identically or differently, H or an aliphatic or aromatic hydrocarbon radical having 1 to 20 C atoms.

23. (Previously Presented) Organic semiconductors according to claim 2, characterised in that the total proportion of structural units of the formula (1) to (5) is 10 – 50 mol%.

24. (Currently Amended) Polymers containing one or more structural units of the formula (1) to (5) and 9,9'-spirobifluorene units



formula (1) formula (2) formula (3) formula (4) formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or N- R^4 , with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

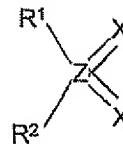
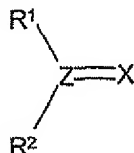
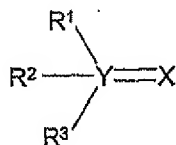
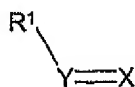
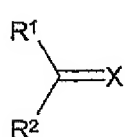
R^1 to R^6 are defined in Claim 1.

25. (cancelled)

26. (Previously Presented) Electronic component which comprises one or more active layers, where at least one of these active layers comprises one or more organic semiconductors according to claim 1.

27. (Original) Electronic component according to Claim 26, characterised in that it is an organic light-emitting diode, an organic solar cell or an organic laser diode.

28. (Previously Presented) Organic semiconductors according to claim 4, characterised in that the recurring units (MONO1) which contain structural elements $L=X$ or structural elements of the formula (1) to (5) are selected from the formulae (6) to (148), which may be substituted or unsubstituted



formula (1)

formula (2)

formula (3)

formula (4)

formula (5)

where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or $N-R^4$, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

Z is on each occurrence, identically or differently, S, Se or Te;

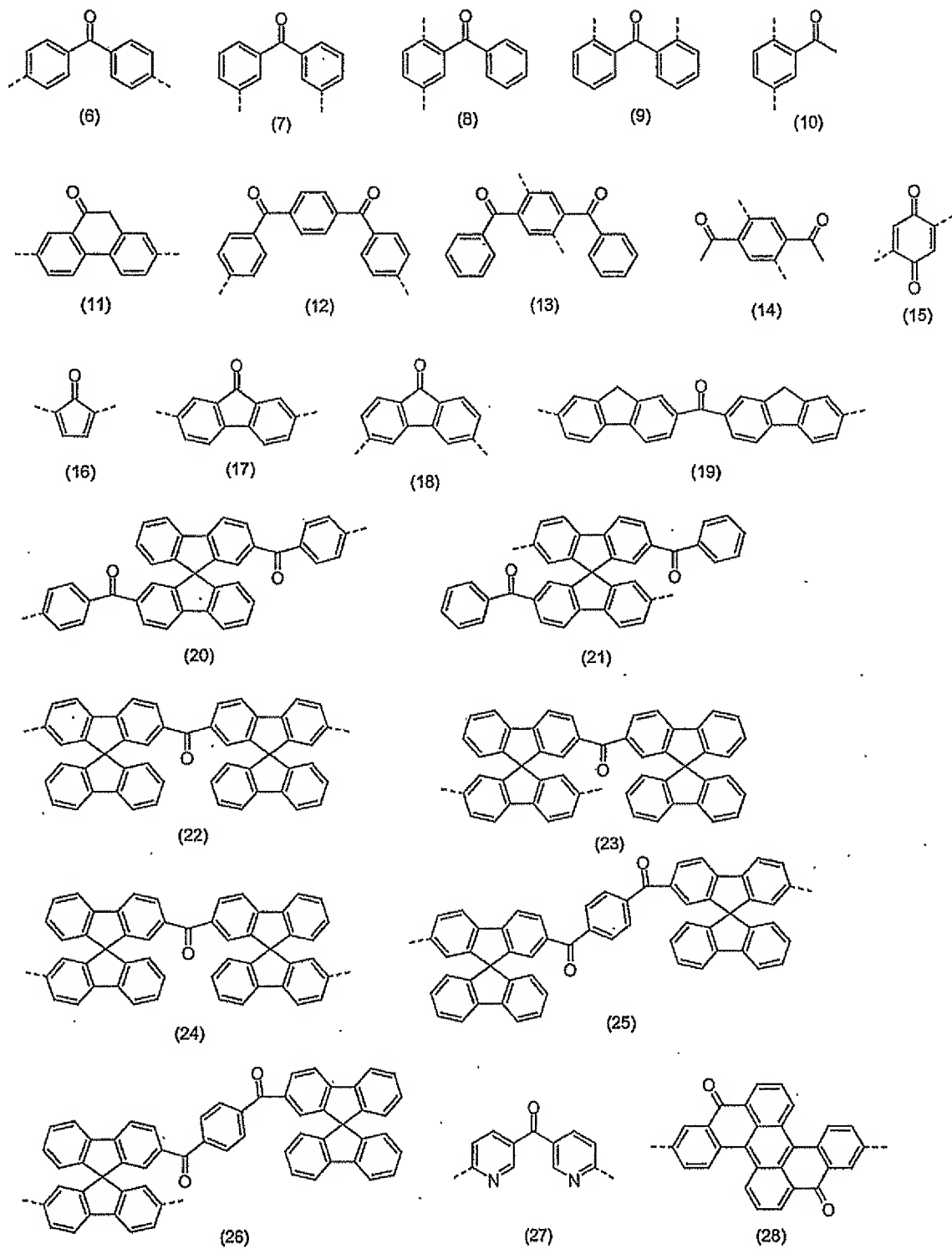
R^1, R^2, R^3 is on each occurrence, identically or differently, H, F, CN, $N(R^4)_2$, a straight-chain, branched or cyclic alkyl, alkoxy or thioalkoxy group having 1 to 40 C atoms, which may be substituted by R^5 or may also be unsubstituted, where one or more non-adjacent CH_2 groups may be replaced by $-R^6C=CR^6-$, $-C\equiv C-$, $Si(R^6)_2$, $Ge(R^6)_2$, $Sn(R^6)_2$, $C=O$, $C=S$, $C=Se$, $C=NR^6$, $-O-$,

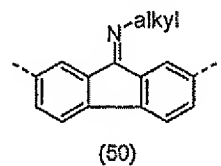
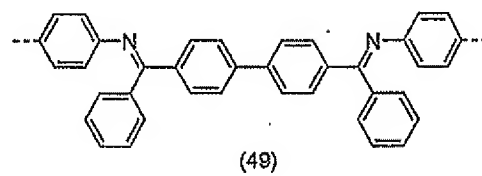
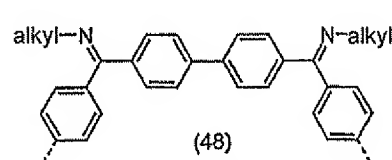
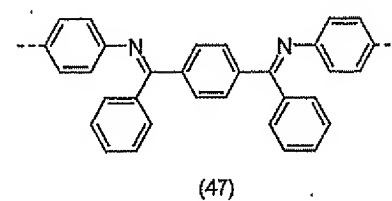
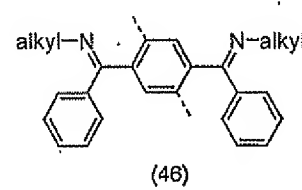
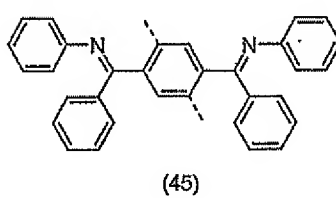
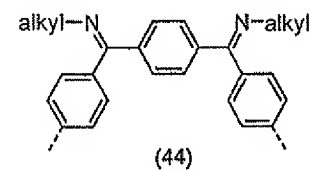
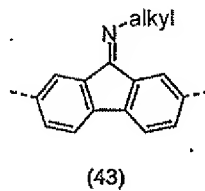
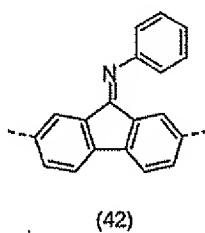
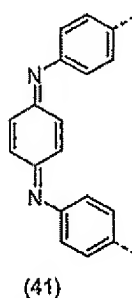
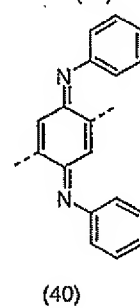
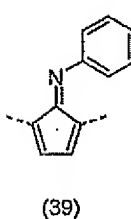
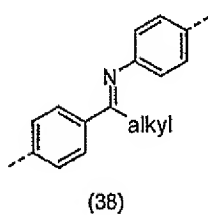
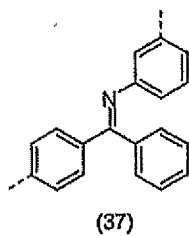
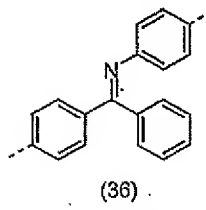
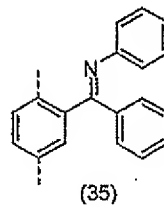
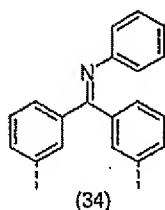
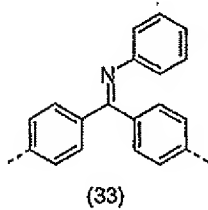
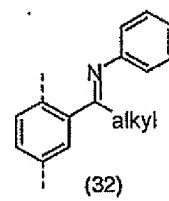
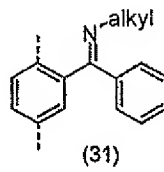
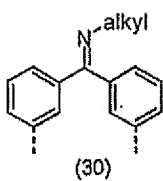
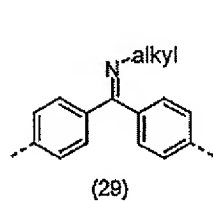
-S-, -NR⁶- or -CONR⁶- and where one or more H atoms may be replaced by F, Cl, Br, I, CN or NO₂, or an aromatic or heteroaromatic ring system having 1 to 40 C atoms, which may be substituted by one or more radicals R⁵, where two or more substituents R¹, R² and/or R³ may also with one another form a mono- or polycyclic, aliphatic or aromatic ring system; all substituents R¹ to R³ on one structural unit here must not be H or F; the groups R¹ to R³ may furthermore optionally have bonds to the polymer;

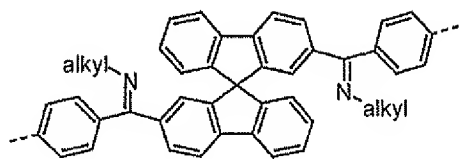
R⁴ is on each occurrence, identically or differently, a straight-chain, branched or cyclic alkyl or alkoxy chain having 1 to 22 C atoms, in which, in addition, one or more non-adjacent C atoms may be replaced by -R⁶C=CR⁶, -C≡C-, Si(R⁶)₂, Ge(R⁶)₂, Sn(R⁶)₂, -NR⁶-, -O-, -S-, -CO-O-, -O-CO-O-, where, in addition, one or more H atoms may be replaced by fluorine, an aryl, heteroaryl or aryloxy group having 1 to 40 C atoms, which may also be substituted by one or more radicals R⁶, or OH or N(R⁵)₂;

R⁵ is on each occurrence, identically or differently, R⁴ or CN, B(R⁶)₂ or Si(R⁶)₃,

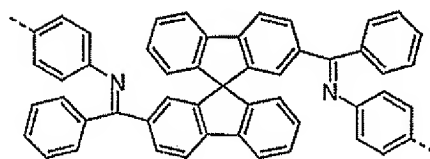
R⁶ is on each occurrence, identically or differently, H or an aliphatic or aromatic hydrocarbon radical having 1 to 20 C atoms,



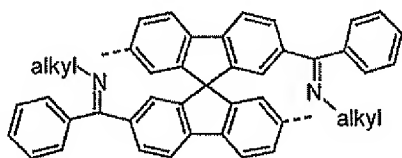




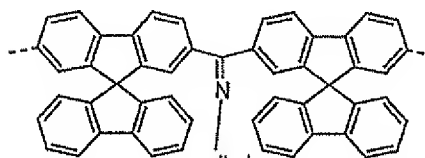
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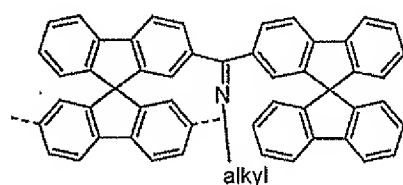
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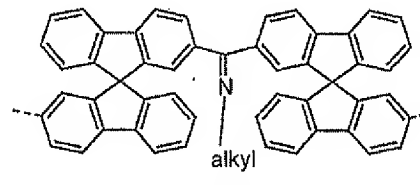
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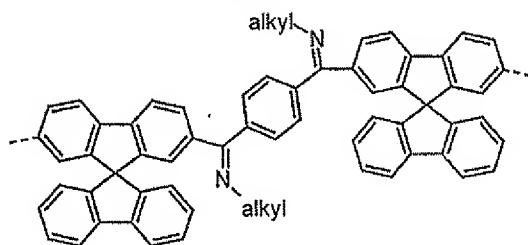
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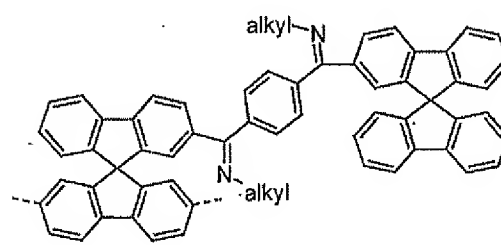
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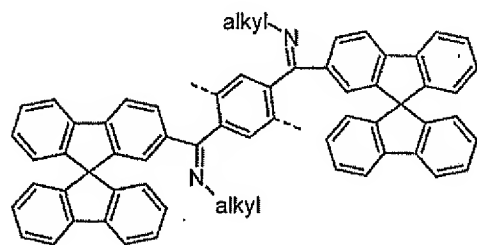
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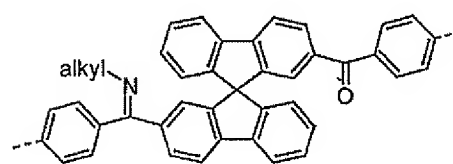
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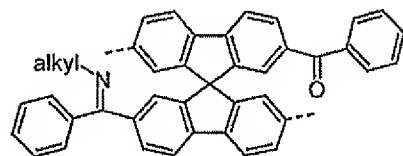
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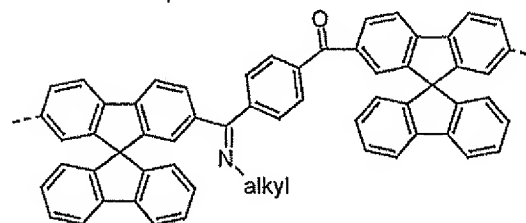
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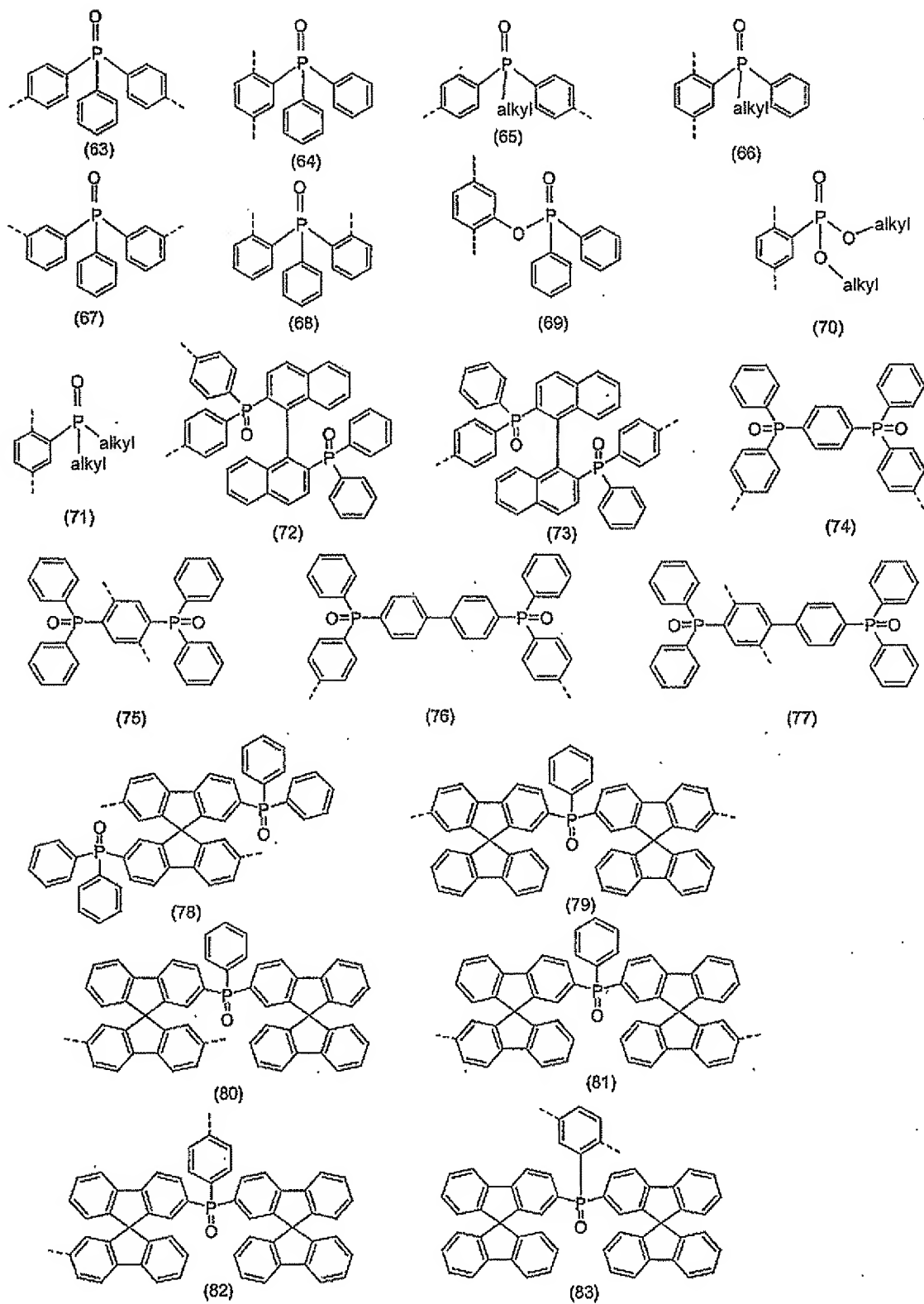
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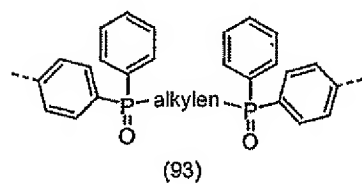
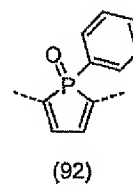
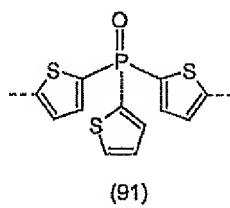
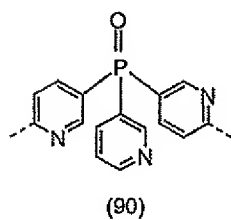
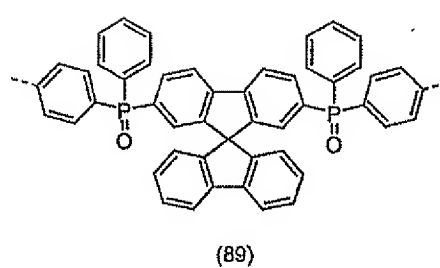
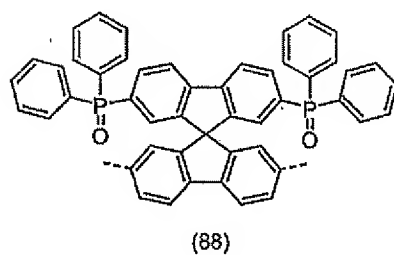
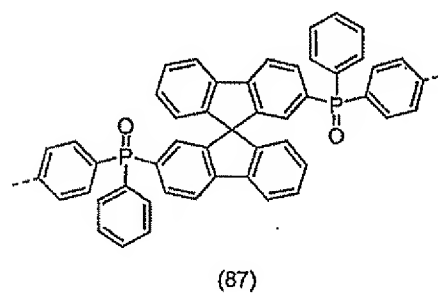
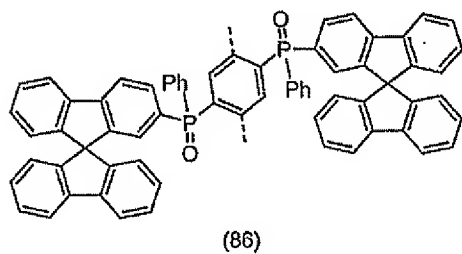
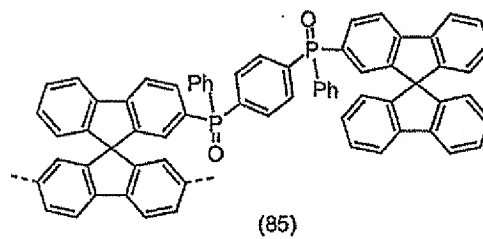
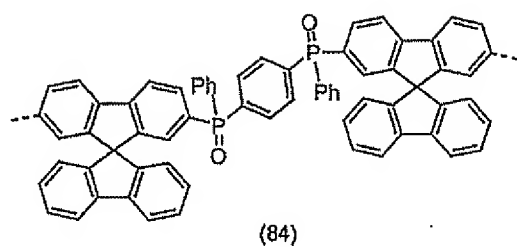


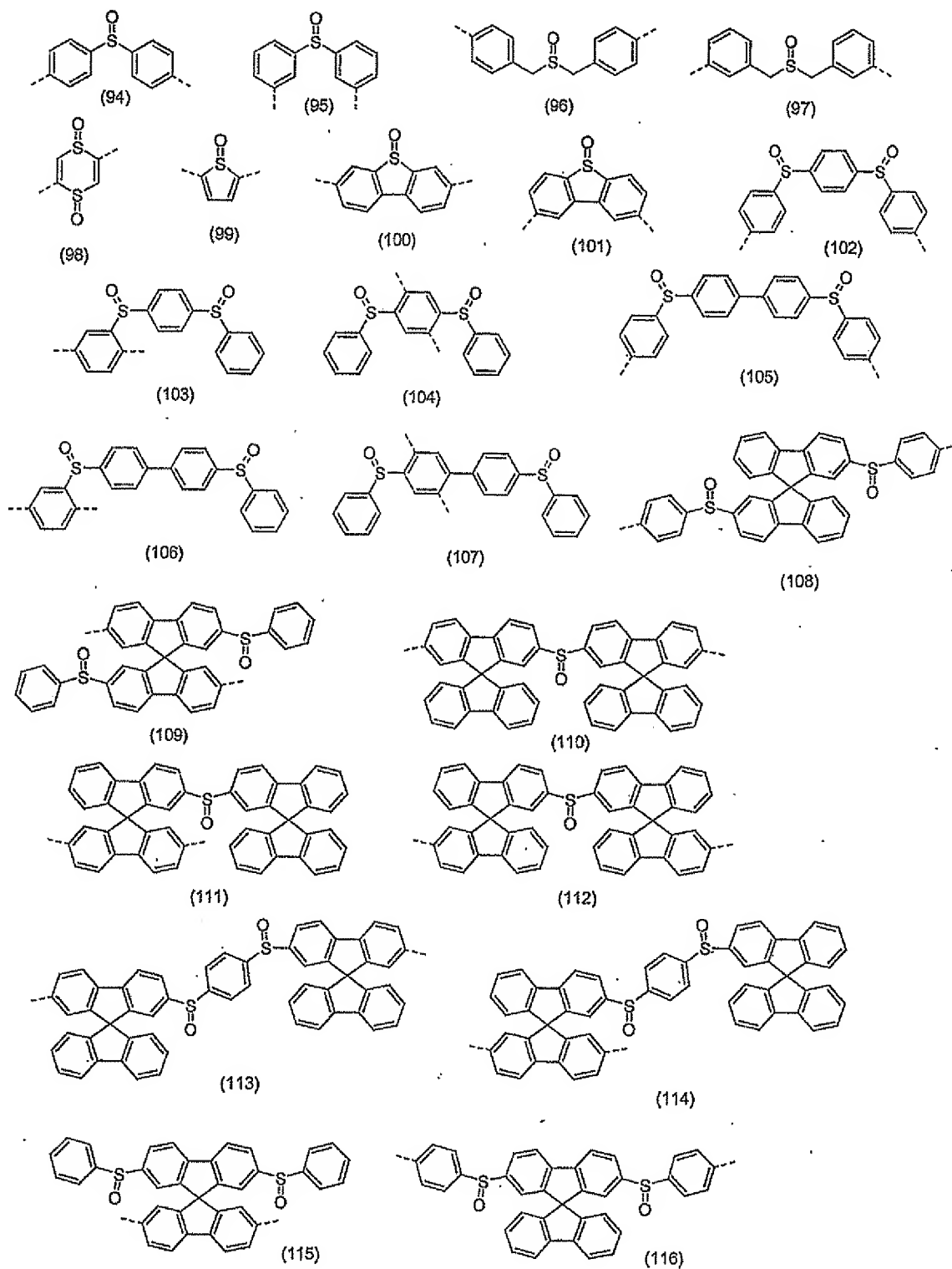
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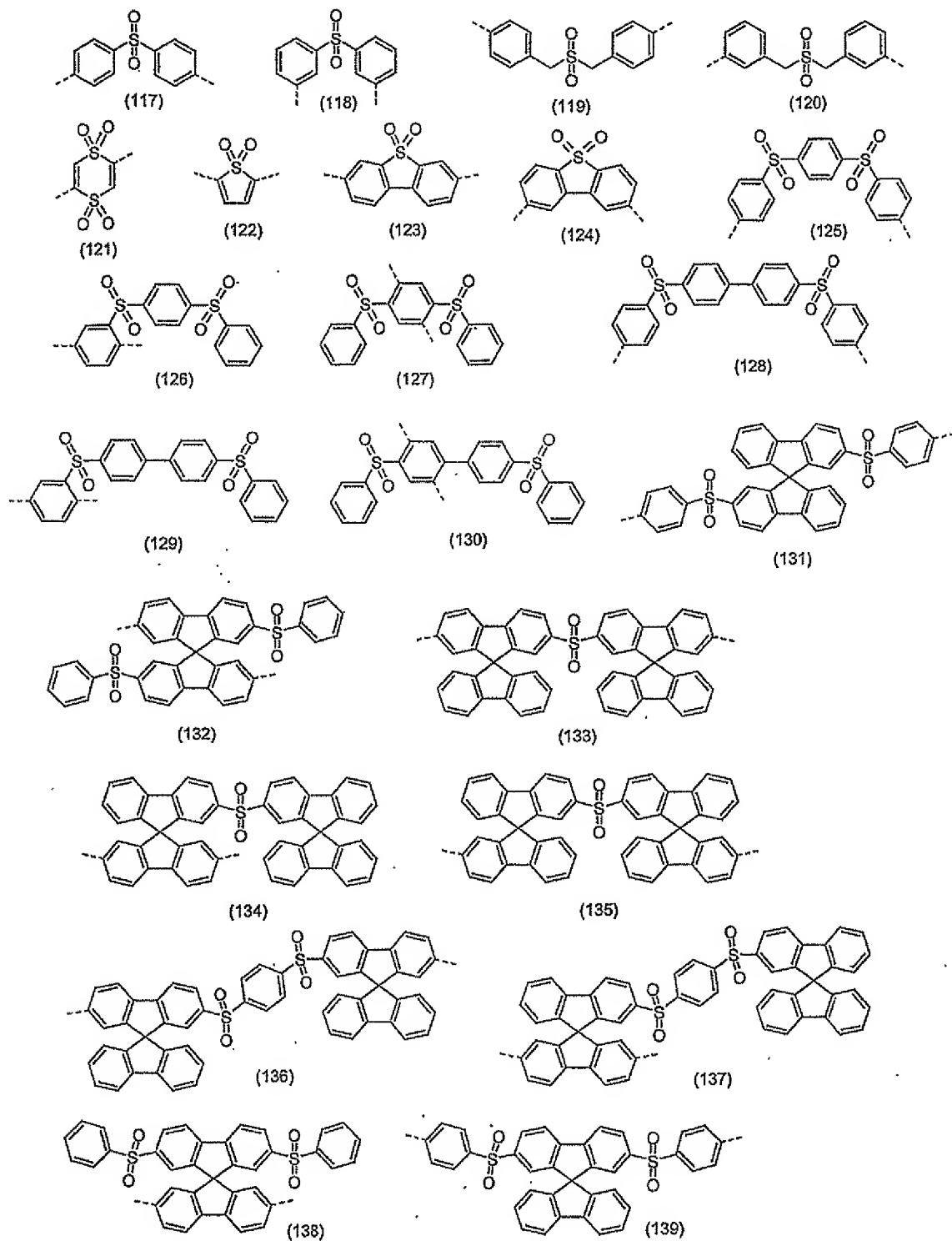


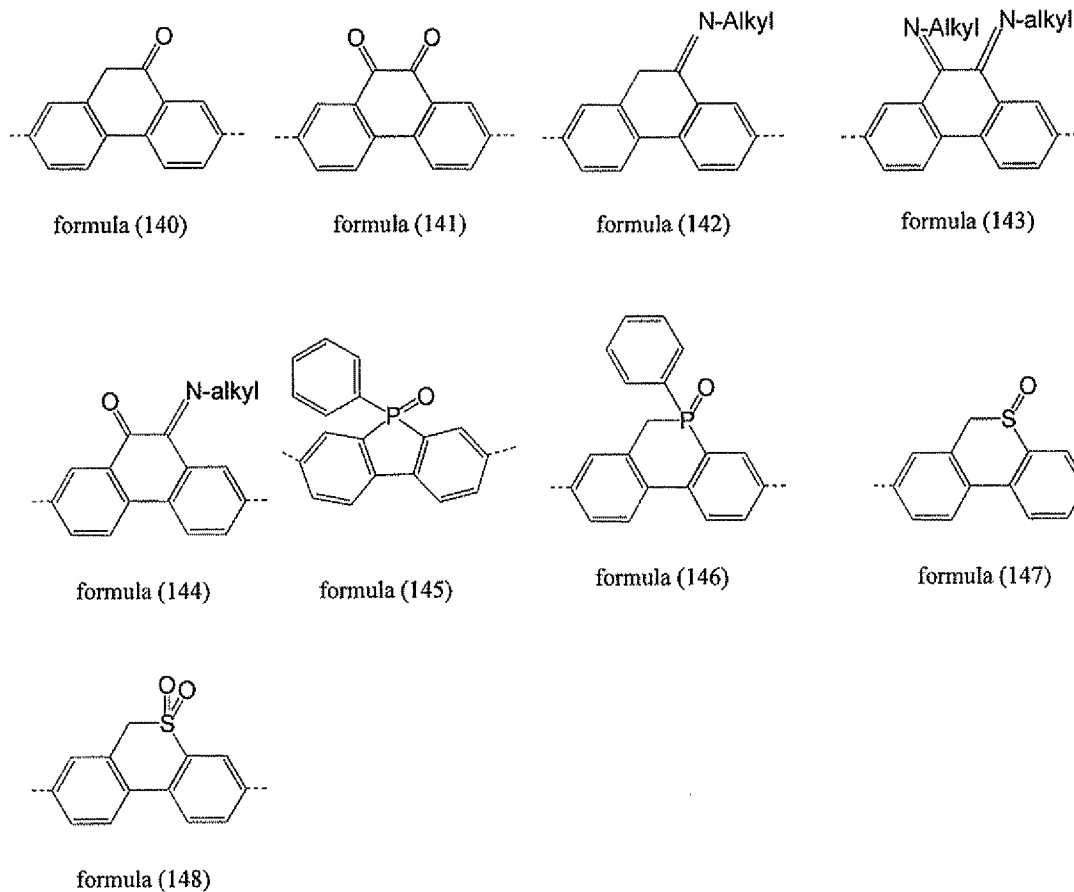
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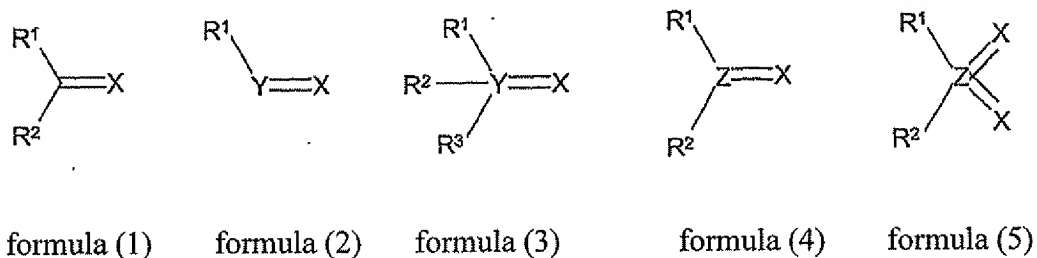








29. (Previously Presented) Organic semiconductors according to claim 6, characterised in that the compound (COMP1) which contains structural elements L=X or structural elements of the formulae (1) to (5) is selected from the formulae (6) to (148), which may be substituted or unsubstituted and wherein



where the symbols used have the following meaning:

X is on each occurrence, identically or differently, O, S, Se or N-R⁴, with the proviso that X cannot be S or Se for formulae (4) and (5);

Y is on each occurrence, identically or differently, P, As, Sb or Bi;

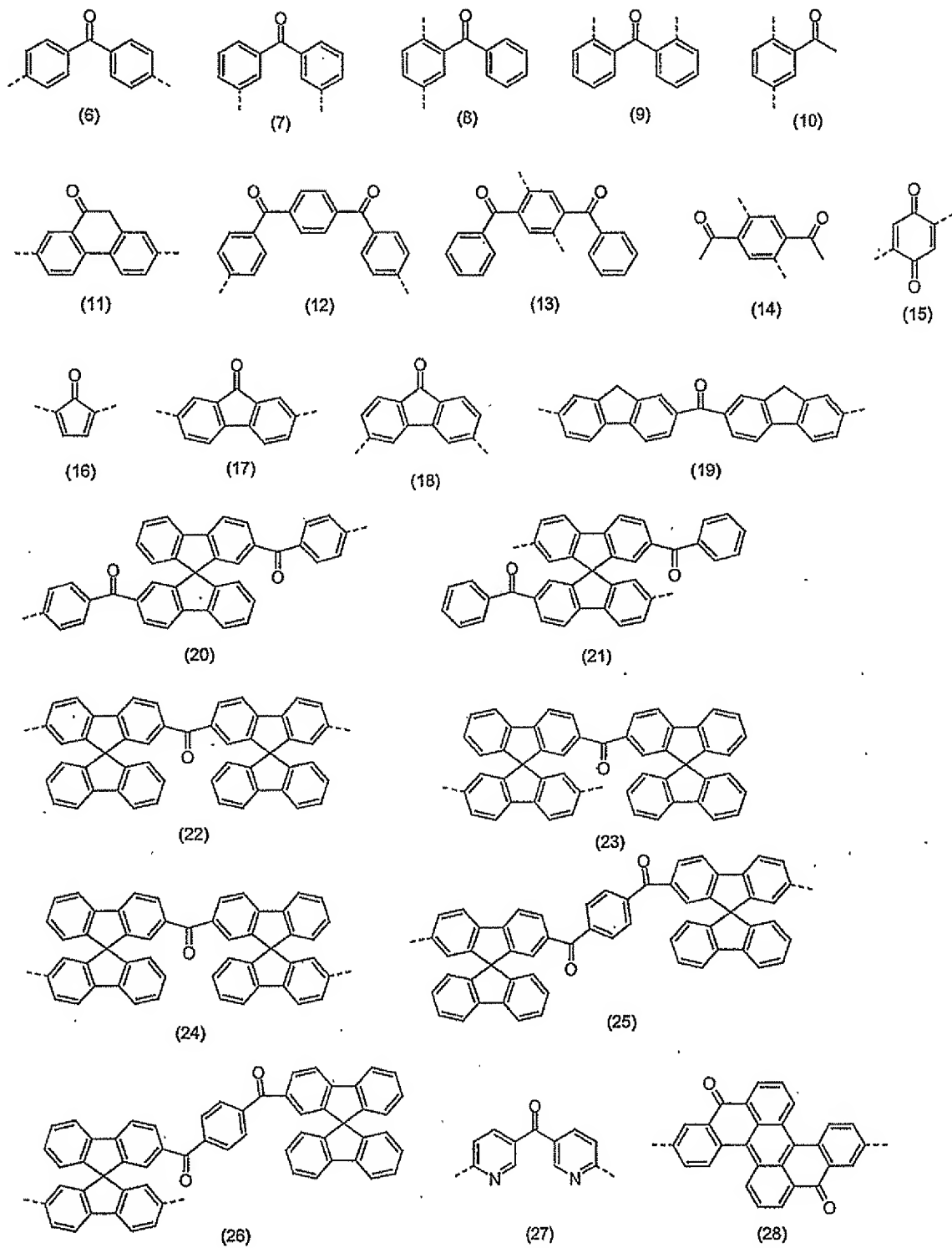
Z is on each occurrence, identically or differently, S, Se or Te;

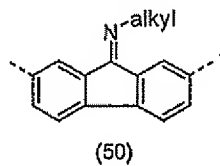
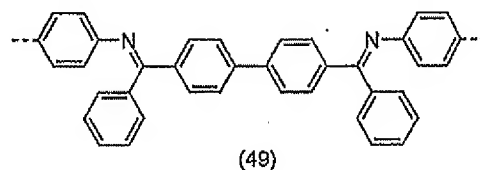
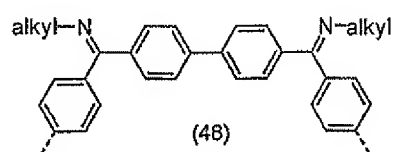
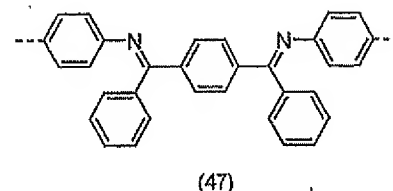
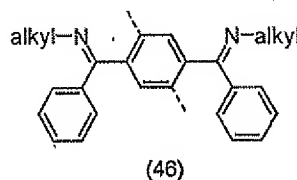
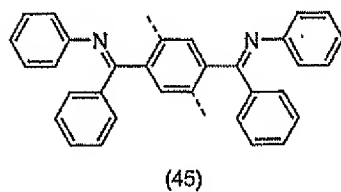
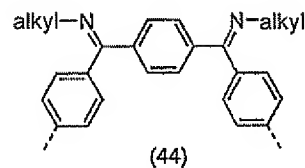
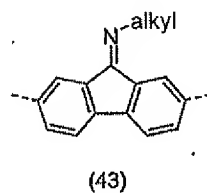
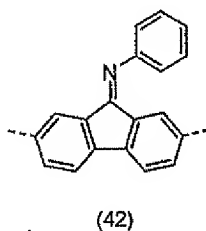
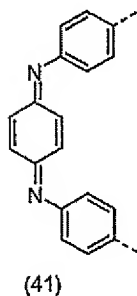
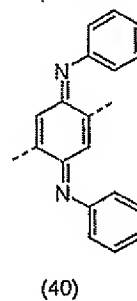
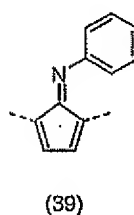
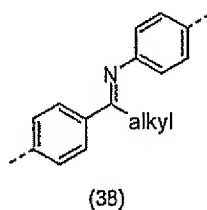
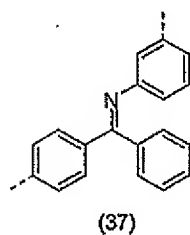
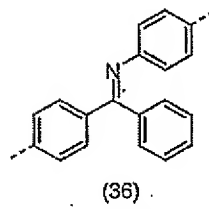
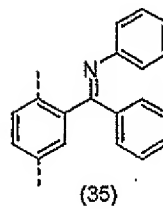
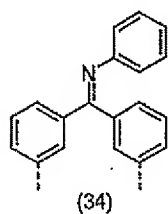
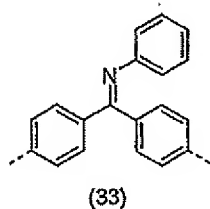
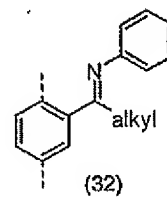
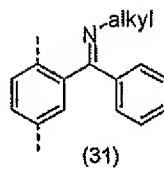
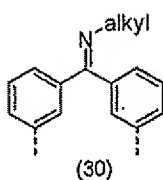
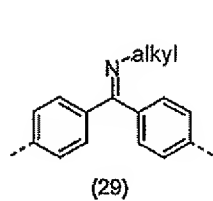
R¹, R², R³ is on each occurrence, identically or differently, H, F, CN, N(R⁴)₂, a straight-chain, branched or cyclic alkyl, alkoxy or thioalkoxy group having 1 to 40 C atoms, which may be substituted by R⁵ or may also be unsubstituted, where one or more non-adjacent CH₂ groups may be replaced by -R⁶C=CR⁶-, -C≡C-, Si(R⁶)₂, Ge(R⁶)₂, Sn(R⁶)₂, C=O, C=S, C=Se, C=NR⁶, -O-, -S-, -NR⁶- or -CONR⁶- and where one or more H atoms may be replaced by F, Cl, Br, I, CN or NO₂, or an aromatic or heteroaromatic ring system having 1 to 40 C atoms, which may be substituted by one or more radicals R⁵, where two or more substituents R¹, R² and/or R³ may also with one another form a mono- or polycyclic, aliphatic or aromatic ring system; all substituents R¹ to R³ on one structural unit here must not be H or F; the groups R¹ to R³ may furthermore optionally have bonds to the polymer;

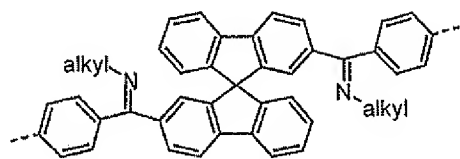
R⁴ is on each occurrence, identically or differently, a straight-chain, branched or cyclic alkyl or alkoxy chain having 1 to 22 C atoms, in which, in addition, one or more non-adjacent C atoms may be replaced by -R⁶C=CR⁶-, -C≡C-, Si(R⁶)₂, Ge(R⁶)₂, Sn(R⁶)₂, -NR⁶-, -O-, -S-, -CO-O-, -O-CO-O-, where, in addition, one or more H atoms may be replaced by fluorine, an aryl, heteroaryl or aryloxy group having 1 to 40 C atoms, which may also be substituted by one or more radicals R⁶, or OH or N(R⁵)₂;

R⁵ is on each occurrence, identically or differently, R⁴ or CN, B(R⁶)₂ or Si(R⁶)₃,

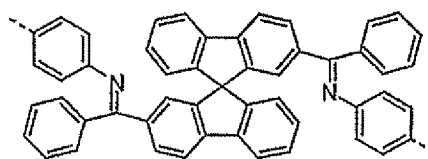
R⁶ is on each occurrence, identically or differently, H or an aliphatic or aromatic hydrocarbon radical having 1 to 20 C atoms,







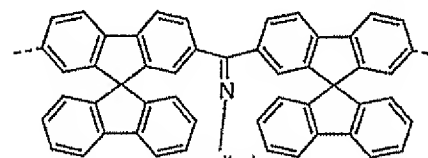
(51)



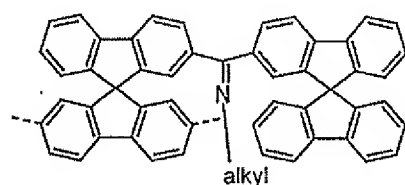
(52)



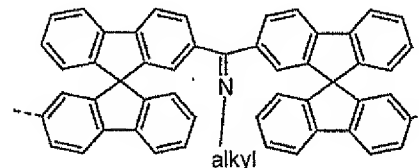
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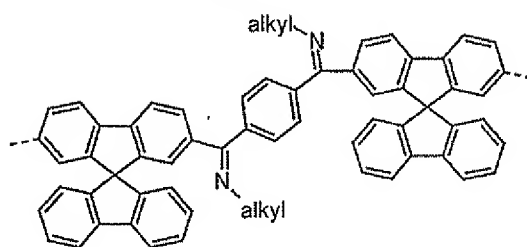
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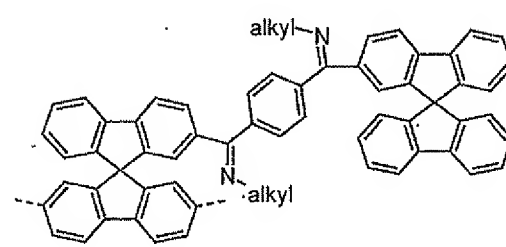
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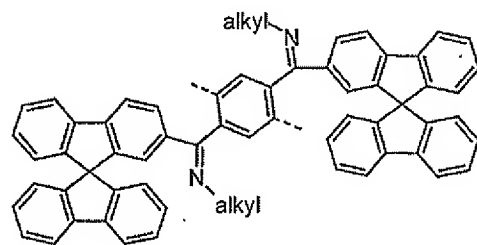
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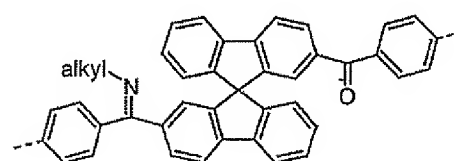
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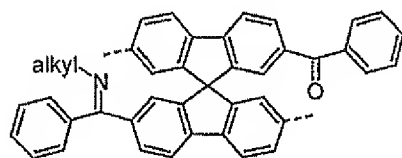
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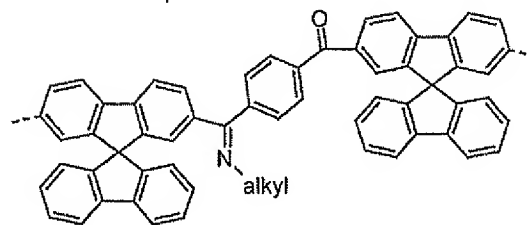
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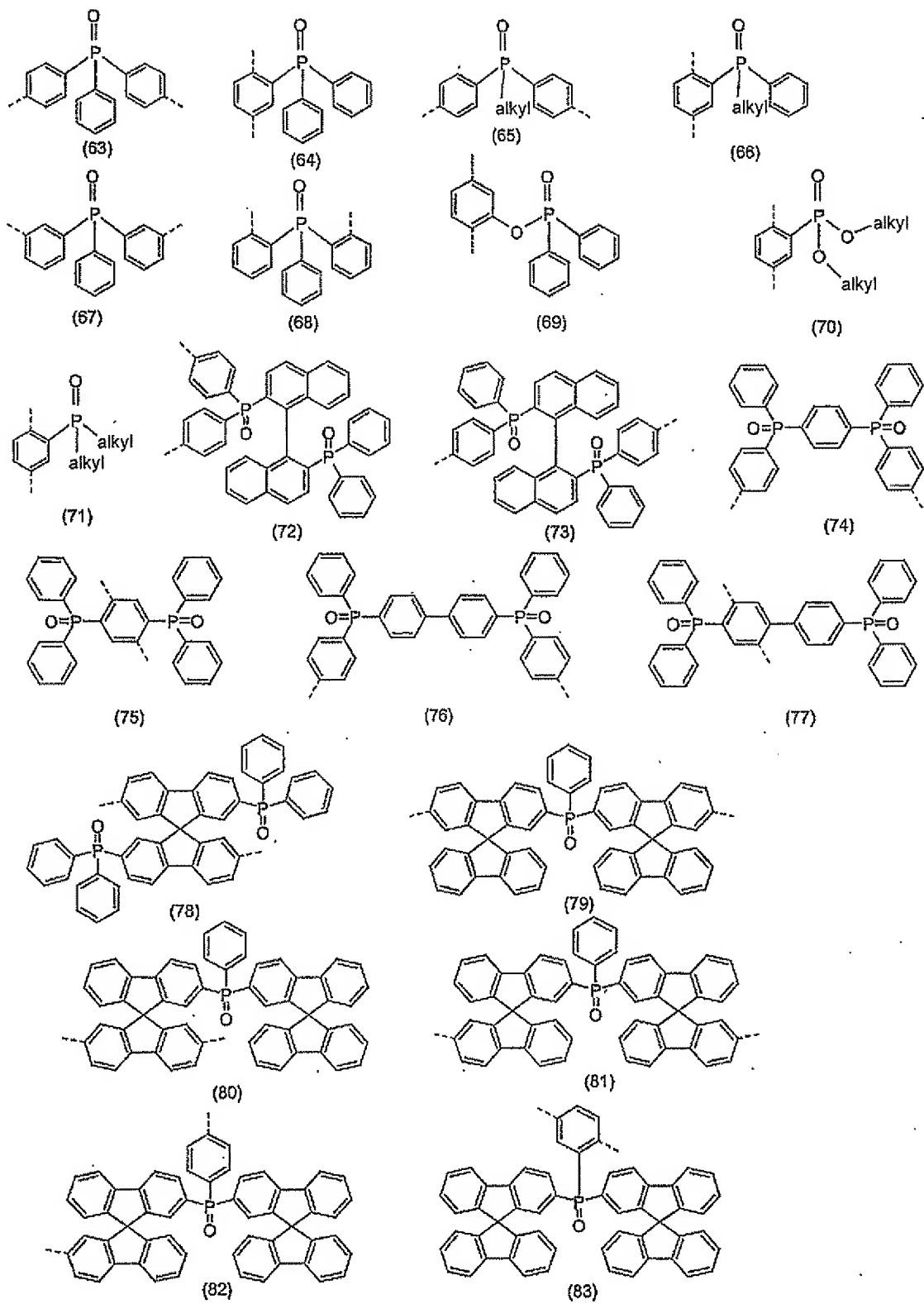
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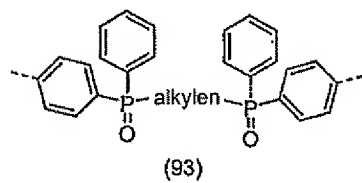
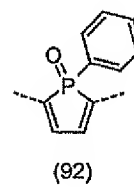
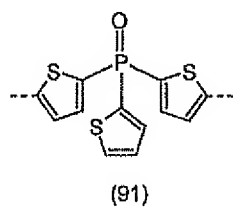
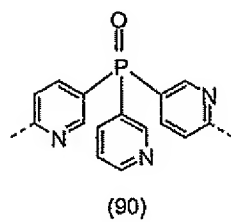
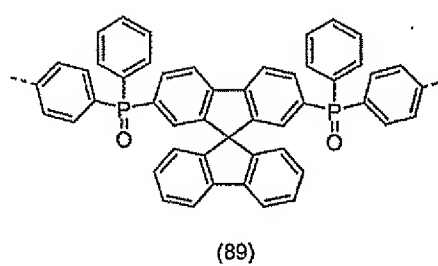
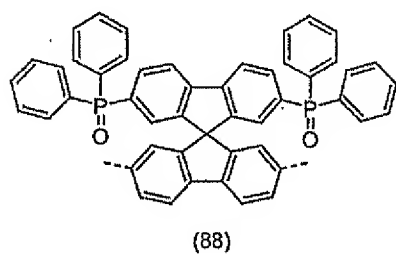
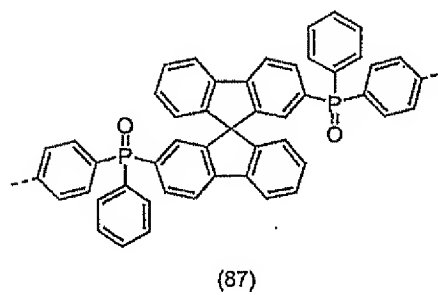
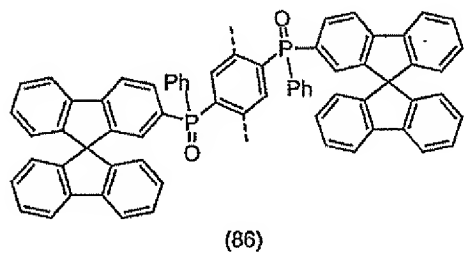
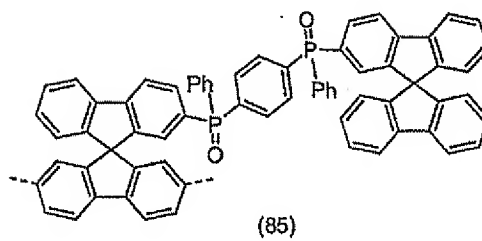
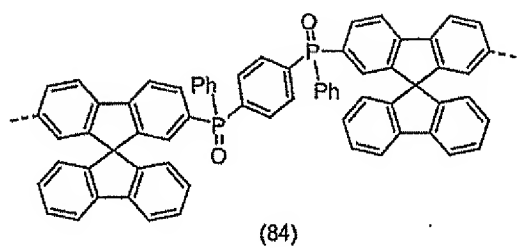


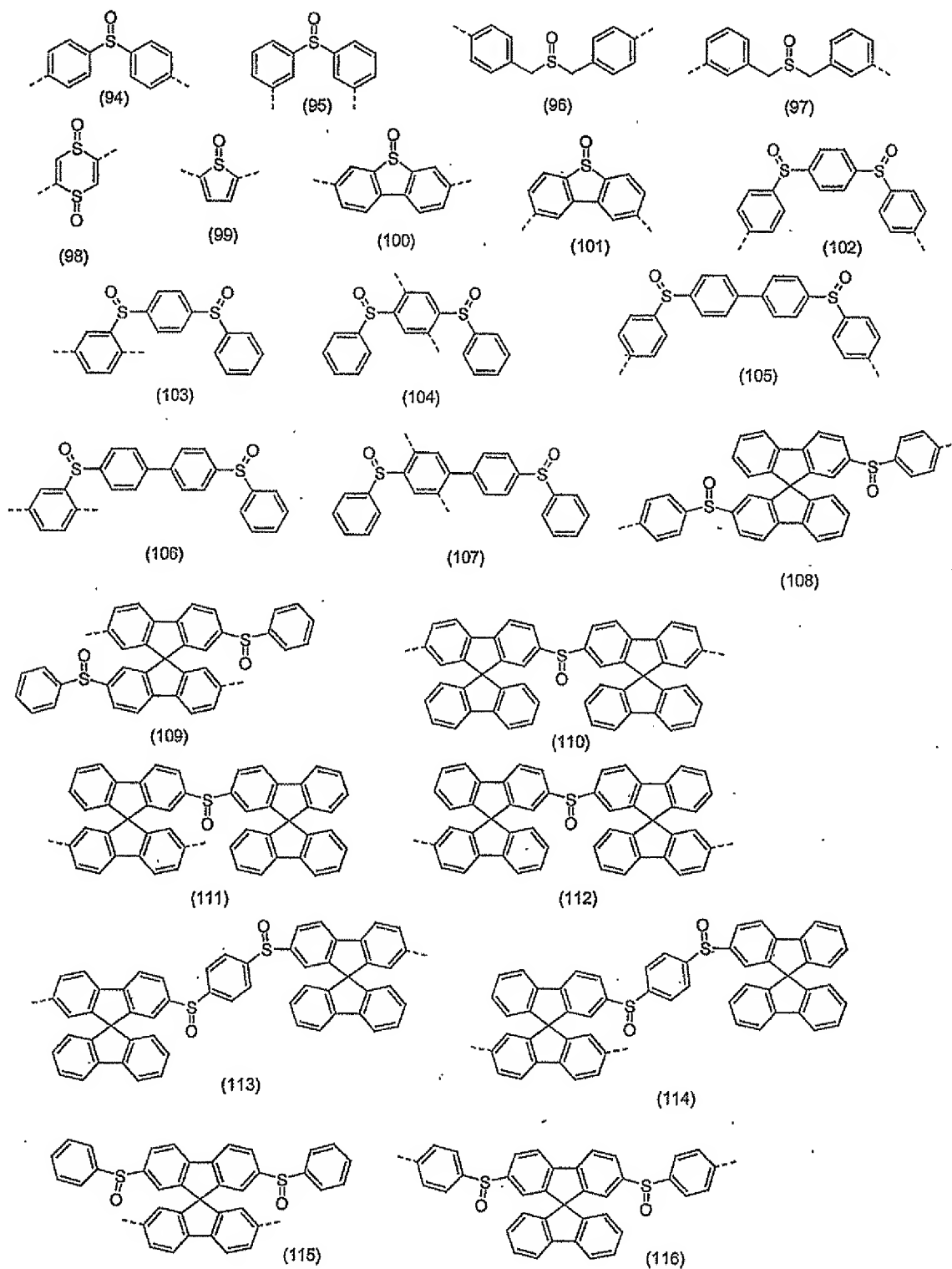
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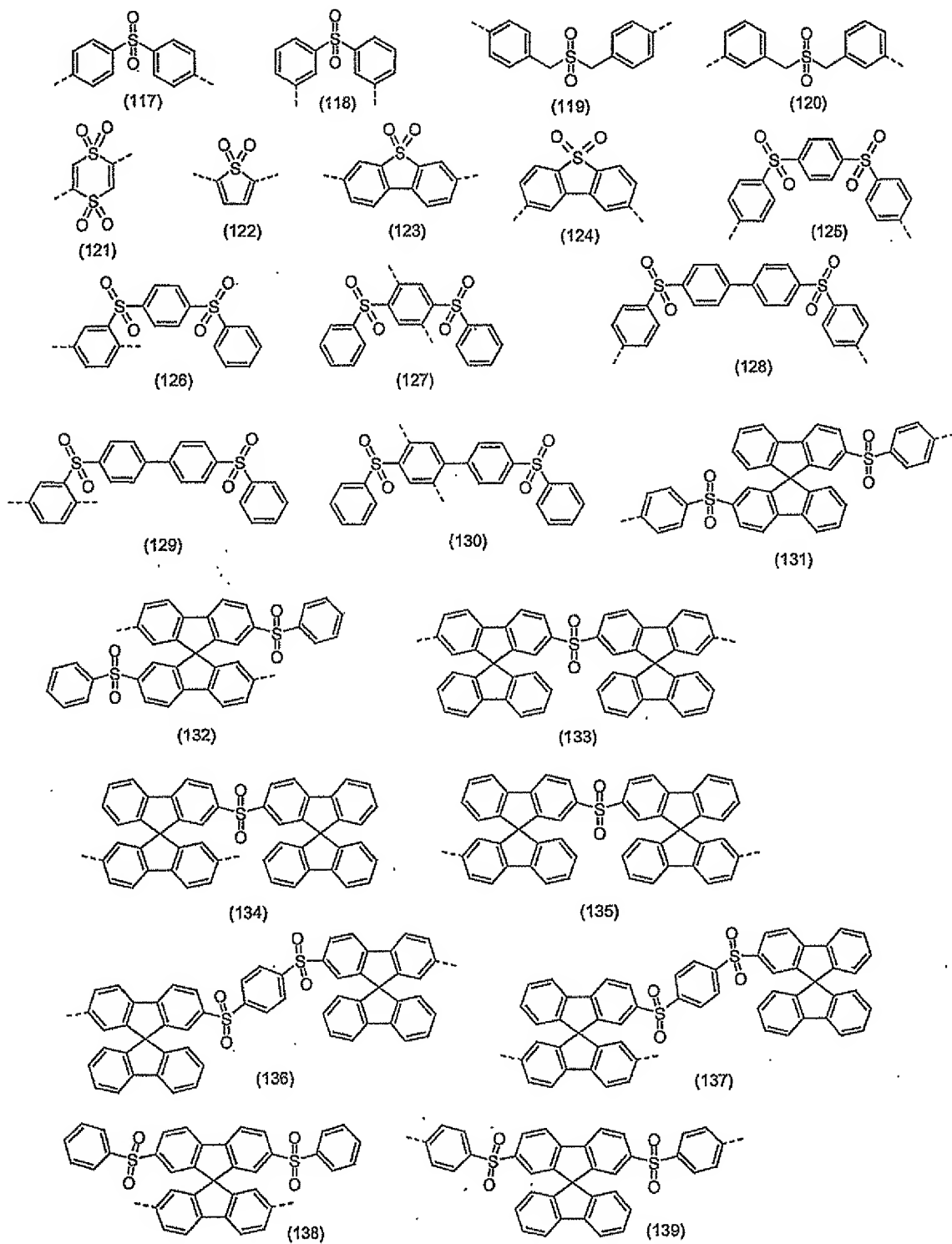


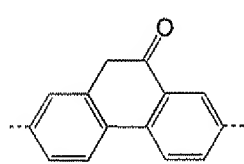
(62)



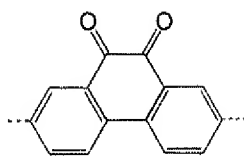




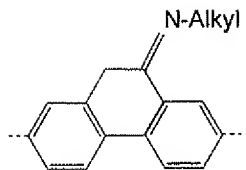




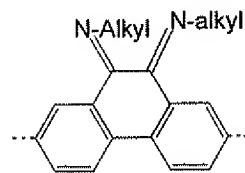
formula (140)



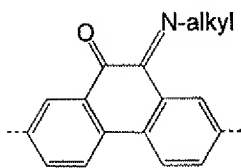
formula (141)



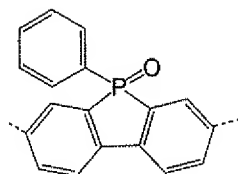
formula (142)



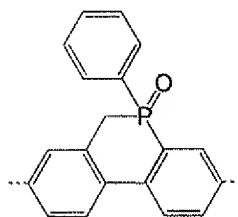
formula (143)



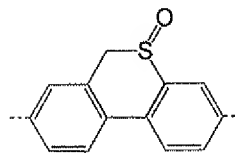
formula (144)



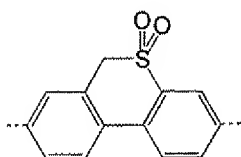
formula (145)



formula (146)

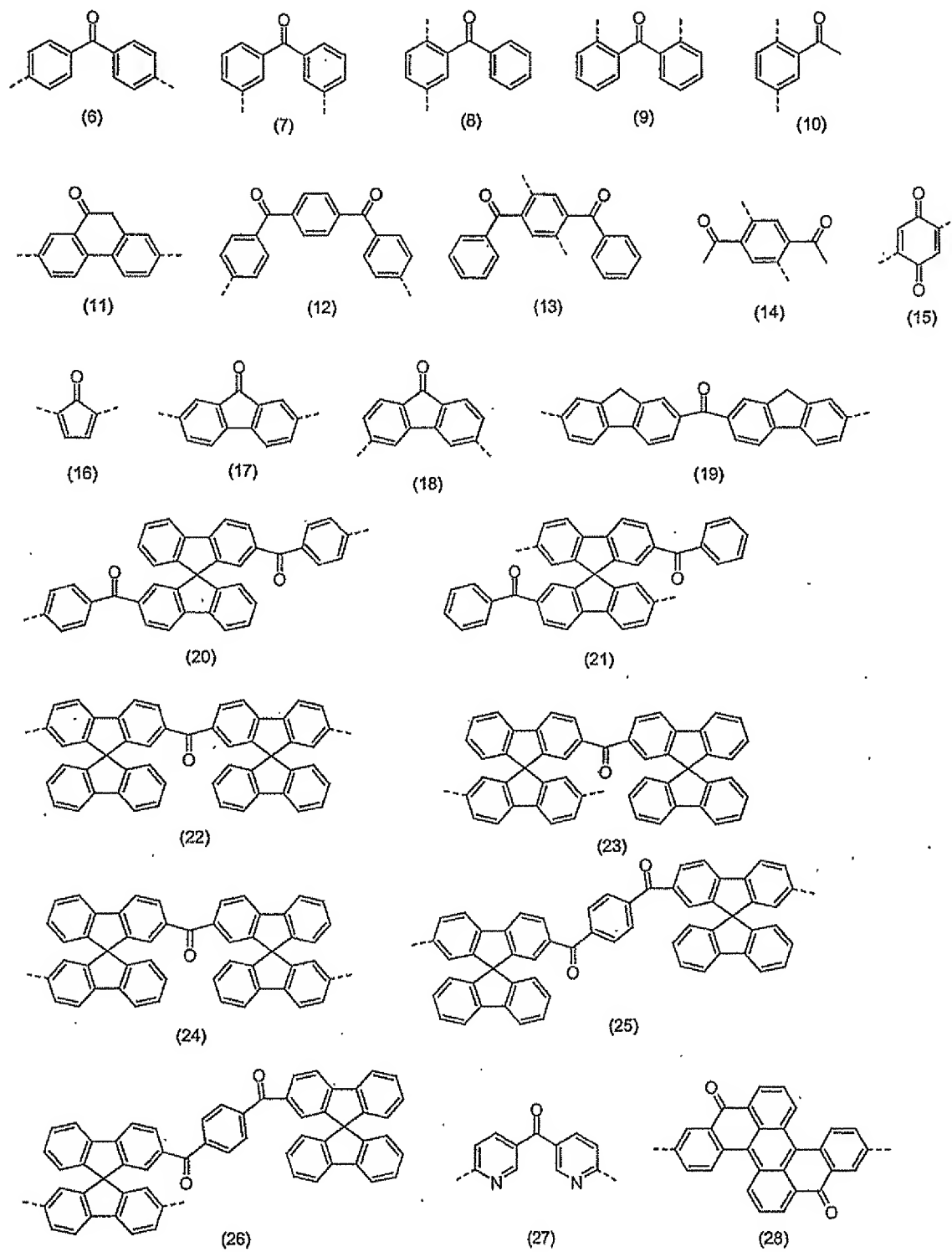


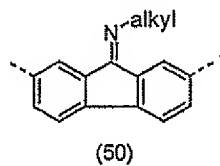
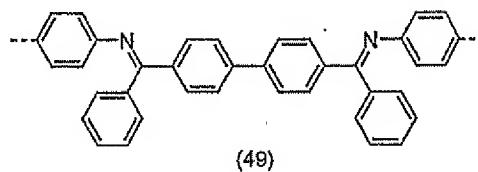
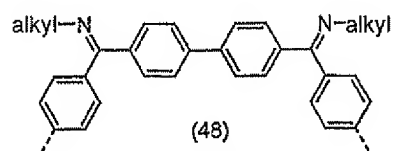
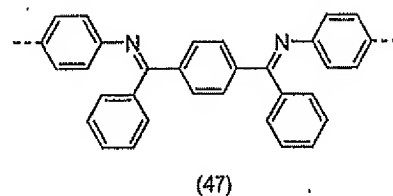
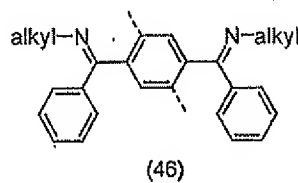
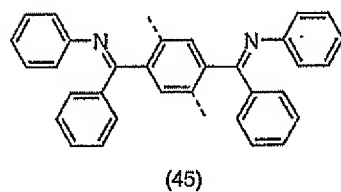
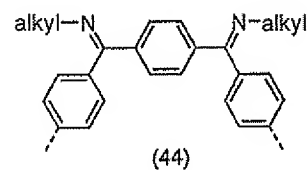
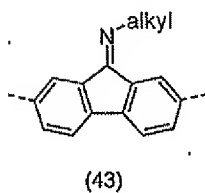
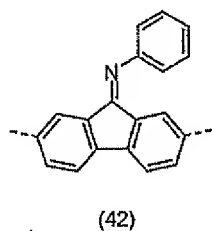
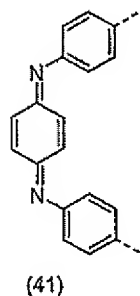
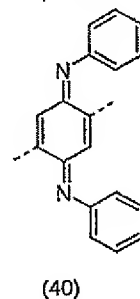
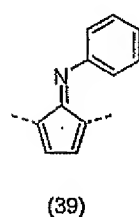
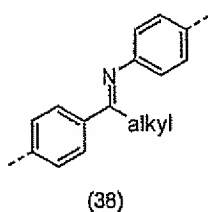
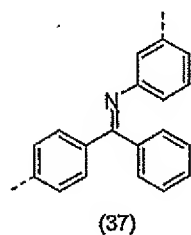
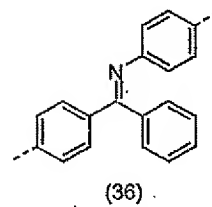
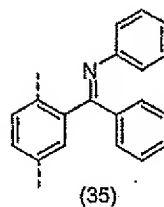
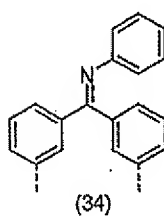
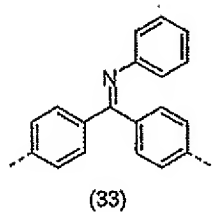
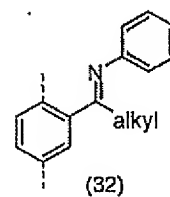
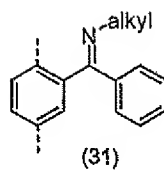
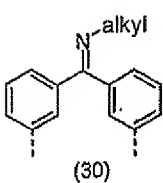
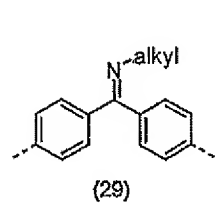
formula (147)

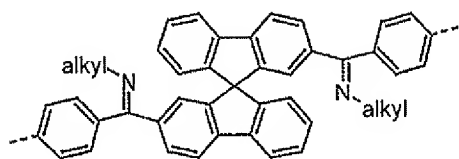


formula (148)

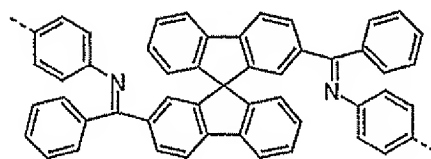
30. (Previously Presented) Organic semiconductors according to claim 7, characterised in that the compound (TRIP3) contains structural elements which are selected from the formulae (6) to (148), which may be substituted or unsubstituted



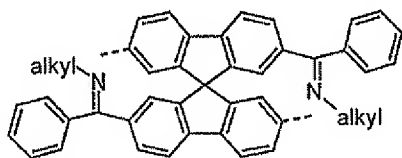




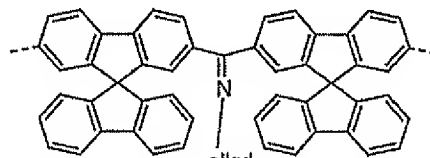
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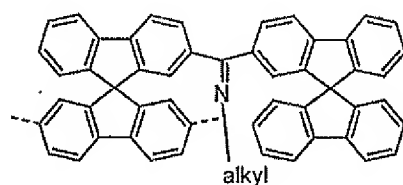
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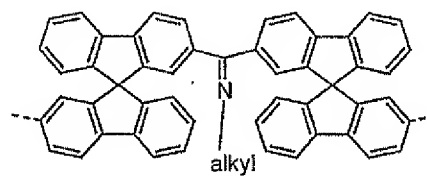
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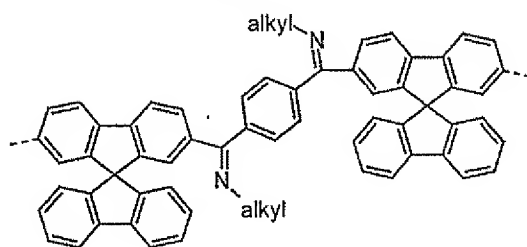
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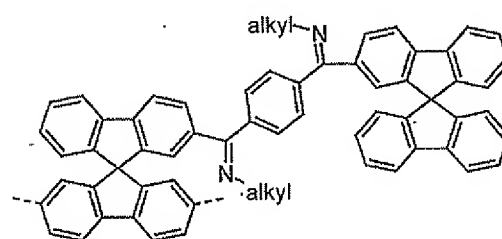
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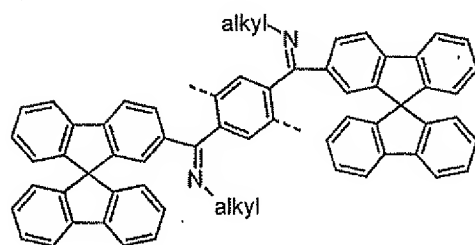
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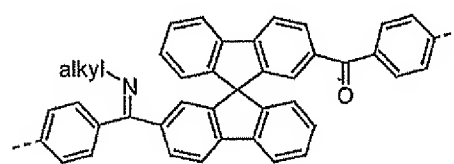
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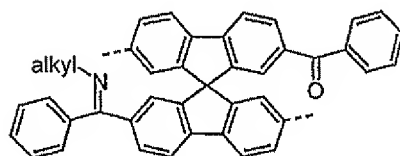
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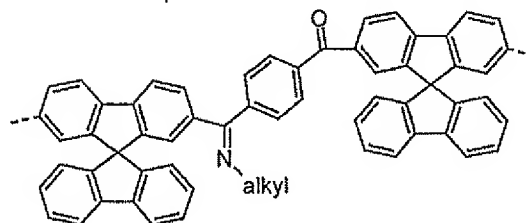
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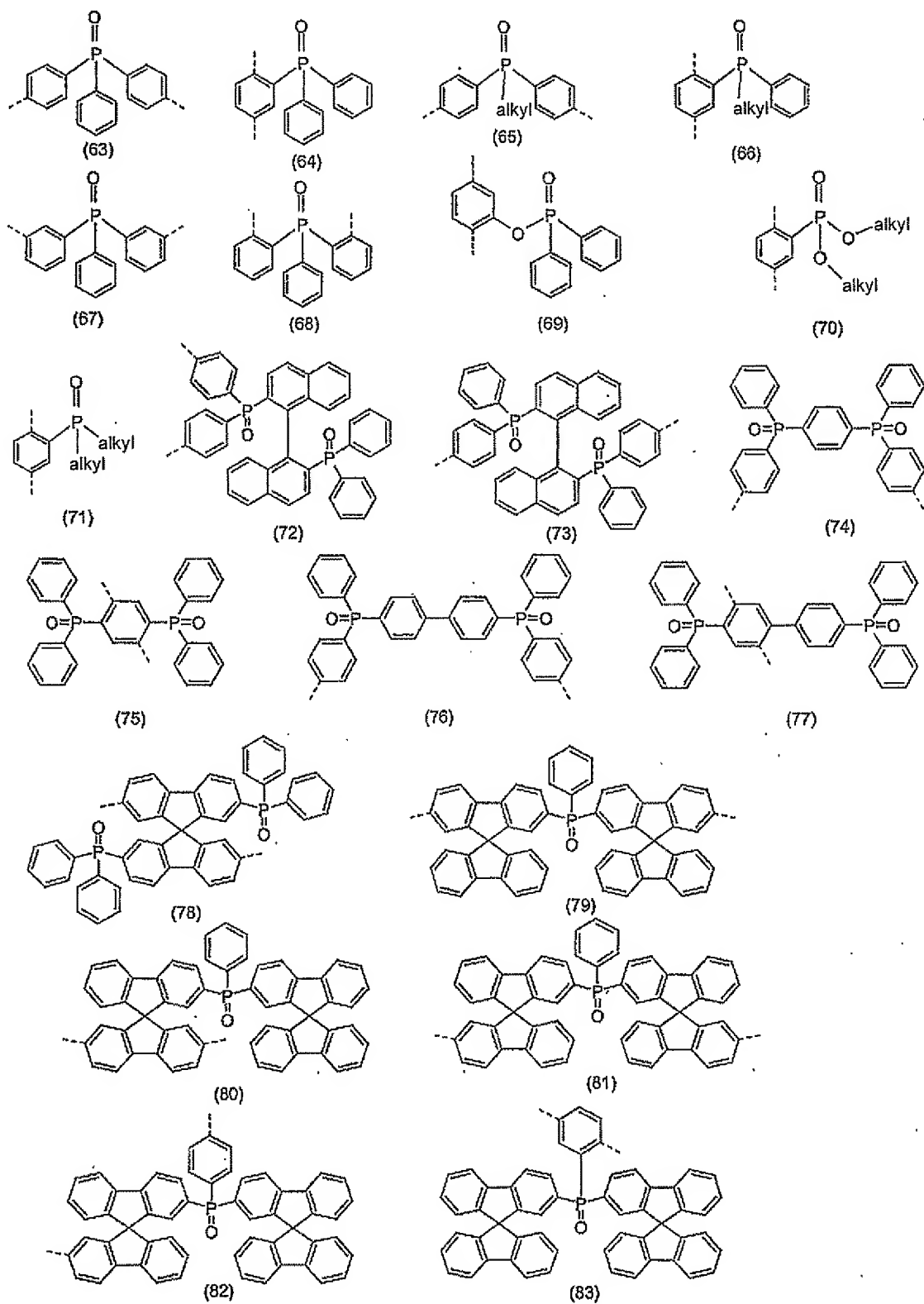
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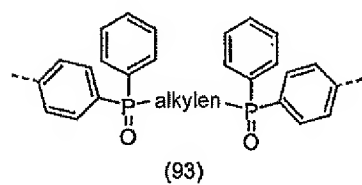
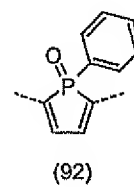
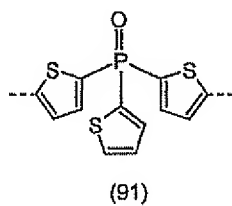
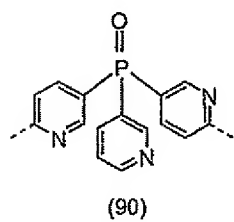
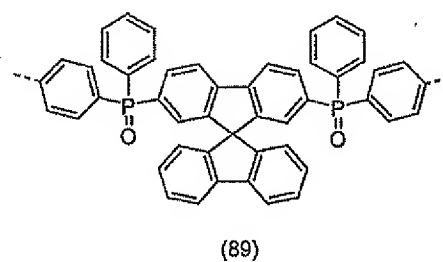
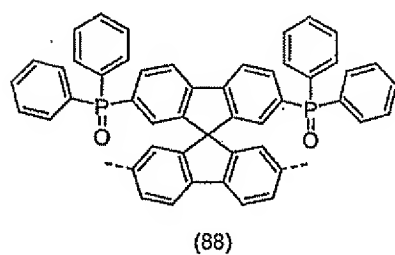
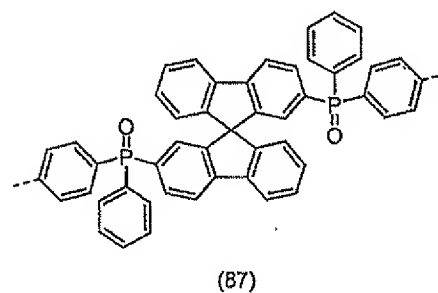
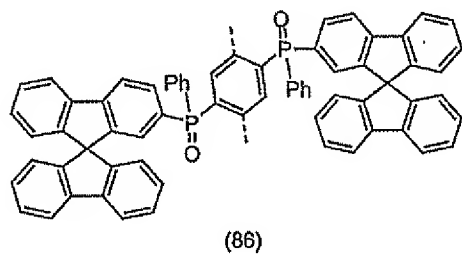
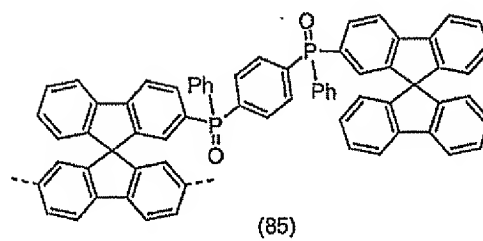
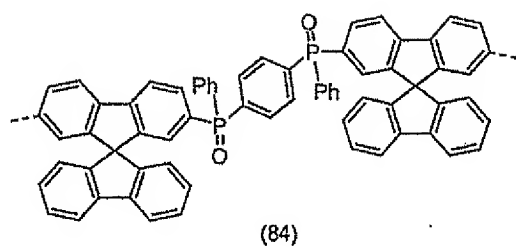


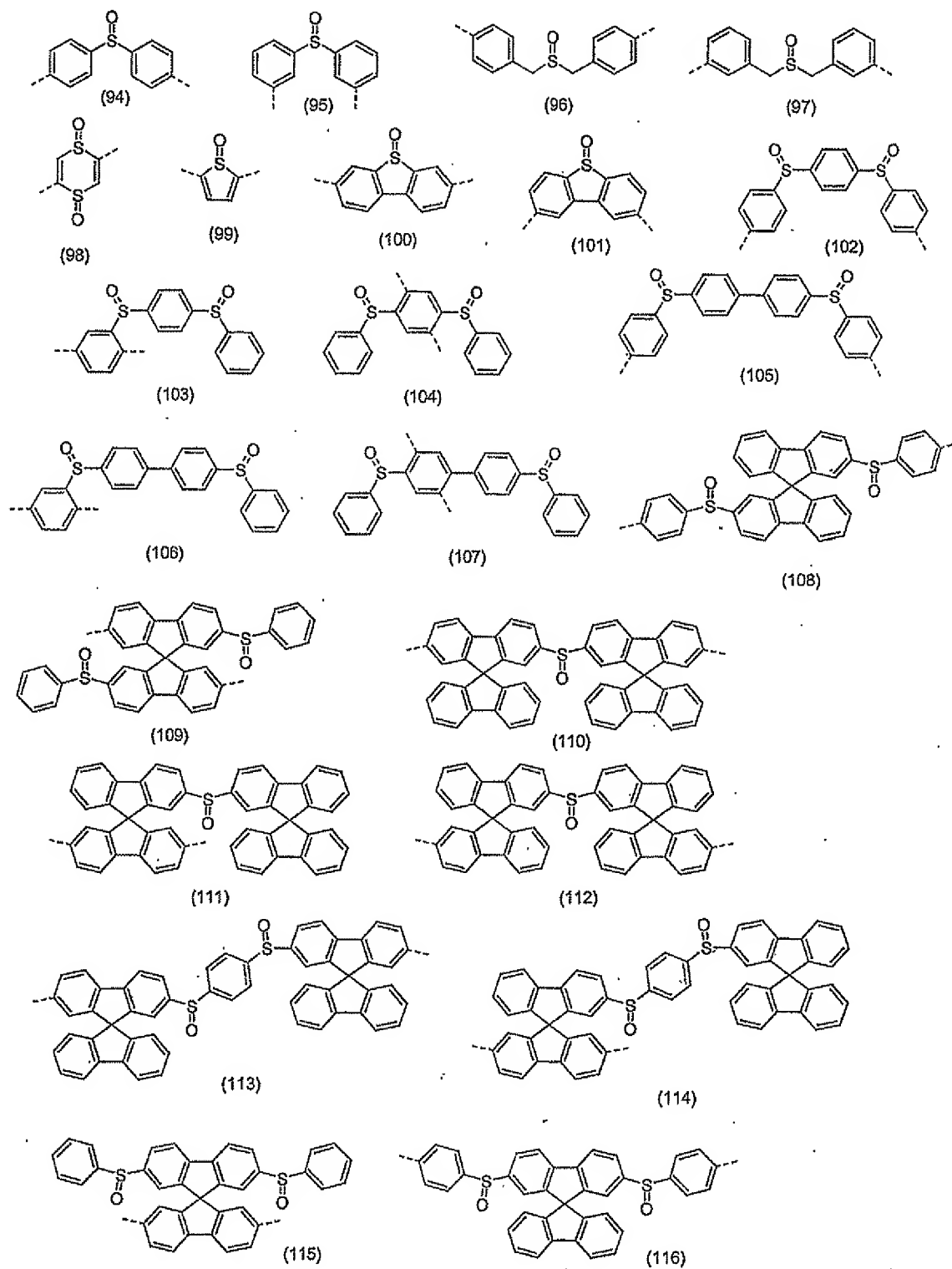
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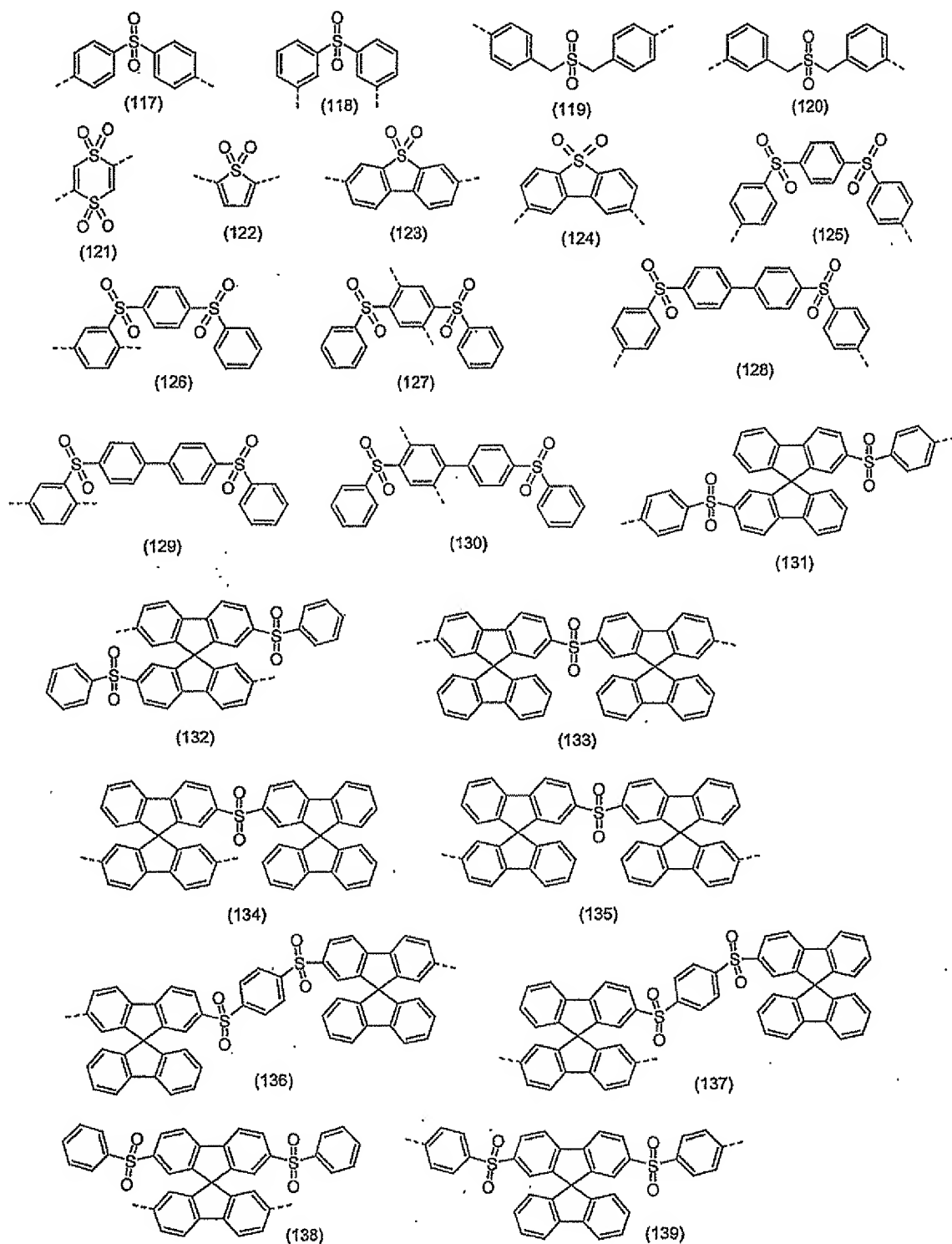


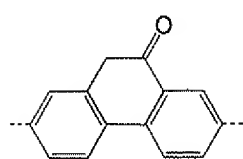
(62)



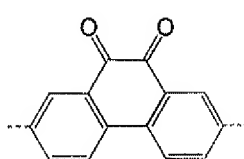




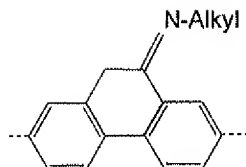




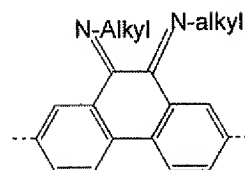
formula (140)



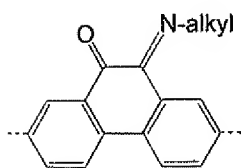
formula (141)



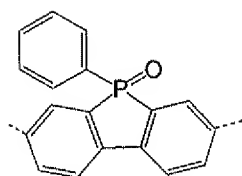
formula (142)



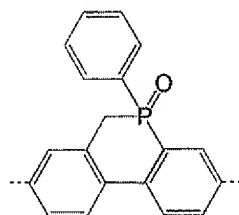
formula (143)



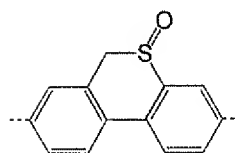
formula (144)



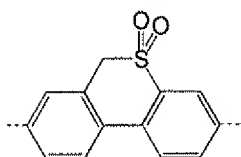
formula (145)



formula (146)



formula (147)



formula (148)